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Very Few Orders for Export

And Domestic Demand is not Active—Prices Firmly Maintained—Ferro-Manganese Situation Relieved

Following a period of considerable excitement in finished materials, owing to the European war, the iron trade is coming to a realization that any benefits that may result from the war will come slowly and probably for many months domestic demand must be depended upon almost exclusively. Although inquiries from abroad are pending in increasing numbers, very few of them have developed into orders and demand for consumption in the United States is decreasing. Hence the present sentiment in the market is not as optimistic as it had been during the preceding two weeks, but confidence that in time there will be a tremendous expansion of business remains unshaken.

Pig Iron

An inquiry for 20,000 tons of foundry grades for delivery during the next 18 months sent out by a Wheeling company received a rather cool reception from pig iron makers, who are not disposed to quote for delivery so far in advance. While it is understood the company is willing to pay about $13.50, valley, for No. 2 foundry, the purchase depends upon the company getting a contract for tube segments to be awarded in New York. The attitude of furnace operators throughout the country is one of firmness as to prices, although very little new business is developing.

Ferro Manganese

Various plans are being considered for increasing the production of ferro-manganese in this country. One company has decided to make the alloy by the electric furnace method and has sold a Pennsylvania steel company several hundred tons for shipment this year at $100 at the plant. An important independent steel company will put a furnace on ferro-manganese and others are considering the advisability of entering the field. They will undoubtedly do so if satisfactory ores can be obtained. At Philadelphia, a leading pig iron agency has sold two additional cargoes of Russian ore which were intended for shipment to Germany, but were diverted to this country. An English steamer has delivered 600 tons of the alloy in Philadelphia and several other cargoes are reported afloat. Limited sales of ferro-manganese were made during the past week at $100 to $110, seaboard, compared with $38 a month ago.

Billets

Inquiries aggregating a large tonnage of billets are pending and prices of all kinds of semi-finished products are firm and tending upward. Makers are conservative as to quoting for foreign delivery and are writing abroad to obtain further particulars as to conditions of delivery and payment.

Plates

Important inquiries for plates for delivery in England are pending, but orders develop very slowly and demand for delivery in this country is light. As the excitement in the tin market has subsided to a large extent, less anxiety is felt by the manufacturers of tin plate. Important consumers of tin plate have specified heavily. Sheet prices are being firmly maintained and activity in buying continues in the east. New business in wire products is light, but specifications are fairly satisfactory. Prices of Norway iron have been advanced $5 a ton, the usual asking price now being $70 per ton.

THE OPEN HEARTH

Obstacles Will Be Overcome

IN CONSIDERING the extension of trade of the United States to South and Central America, it is not difficult to see the difficulties involved. Absence of an American merchant marine and the inadequate banking facilities afforded exporters in the southern countries are factors of large importance. It is also true that political and industrial conditions in the republic south of the United States are far from ideal. Mexico's industries, owing to the different revolutions, are almost at a standstill. The countries of Central America, with the exception of Costa Rica, are in poor condition, on account of unsatisfactory currency, revolutions and other causes. South American countries likewise have had many troubles, political and industrial. Even in Argentina, the most prosperous of the South American countries, speculations in lands and extravagent expenditures for public improvements have caused financial depression. In Brazil, poor prospects for coffee and rubber, the two leading products, have contributed this year to unfavorable economic conditions.

The representative of one of the large Boston banks, after spending several months in South America, studying the general conditions with the view to establishing connections there, returned recently and has given an interview, calling attention to the increasing number of failures in Argentina since 1909. Another Boston man, who has been for years the resident representative in Argentina of an exporting and importing house, says it is probable that anybody who will sell on long credit in South America will get the business, but he adds that it is another question whether he will ever get his cash. Many other expressions of men who know what they are talking about could be cited to show the importance of exercising extreme caution in engaging in South American business.

There is, however, a bright side. Without belittling at all the obstacles in the way, it is well to look at the facts as to what other countries have done in South America. Even to the countries disrupted by revolutions, heavy exports have been made, while many millions of dollars worth of goods have been purchased by the three great South American countries with which, owing to our attitude toward Mexico, we are now on more friendly relations than ever before. Argentina, in 1911, imported merchandise to the value of $105,000,000 from the United Kingdom, $65,000,000 from Germany, $37,000,000 from France and only $50,000,000 from the United States. Brazil, in the same year, imported merchandise worth $85,000,000 from Great Britain, $45,000,000 worth from Germany, and only $35,000,000 worth from the United States. Chile, in 1911, imported more than twice as much from Great Britain as from the United States, although her imports, as was also true in the case of Argentina and Brazil, were largely of cotton goods, coal, oil, machinery and other products which could have been obtained in the United States.

In spite of the difficulties involved, we are firmly of the belief that the people of the United States will find a way to capture a large part of the business which has formerly gone to the European countries now at war. The task will not be easy, but it can be accomplished and by American courage, energy and persistence it will be.

The President Should Act

THE act granting American register to foreign-built ships was passed by Congress nearly two weeks ago, but it is not yet effective, owing to the fact that the President has not made his position known. Large exporting companies that own their own ships which had hitherto sailed under foreign flags are asking for presidential action. Their vessels are loaded and are waiting at various ports under heavy expense. The President ought not to delay unnecessarily in a matter as important as this, but should declare himself at once.

Section 2 of the act provides as follows, that "The President of the United States is hereby authorized, whenever in his discretion the needs of foreign commerce may require, to suspend by order so far and for such length of time as he may deem advisable, the provision of

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law, prescribing that all the watch officers of vessels of the United States registered for foreign trade shall be citizens of the United States. Under like conditions, in like manner and to like extent, the President of the United States is also hereby authorized to suspend the provisions of the law requiring survey, inspection and measurement by officers of the United States of foreign-built vessels admitted to American registry under this act."

The act cannot be made effective until the President declares himself upon the points involved in the above section. American corporations owning vessels are naturally desirous of knowing whether they can retain the present personnel on board their ships. To retain them for a definite period at least is the quickest way to get our over-sea trade moving and it would be well for the President to issue a proclamation to that effect. Of course, the various organizations of masters and mates are likely to oppose this provision, but they should bear in mind that the measure is intended for emergency purposes only and will cease to operate when the emergency ceases to exist. It is believed that there is not a sufficient number of officers holding American licenses available to fill all the positions that would be open under this act. Of course, they can be developed as time proceeds, but what is now desired is an immediate movement of freight over sea. Our export trade is stalled at present on account of need of ships and the business of the whole country is affected thereby. If this measure can afford any relief, the shortest route should be taken to put it into effect.

Encouraging the Use of Trade Papers

RECOGNIZING the valuable service that the representative trade paper renders for themselves and the possibilities for good that it holds for those in subordinate positions, the officials of the Ellwood City, Pa., works of the Shelby Steel Tube Co., have hit upon an effective plan for enlarging the field of usefulness of such publications in their plant.

At these works, THE IRON TRADE REVIEW and other leading trade papers go first to the central office, where their contents are perused and studied carefully by the executive officials of the various departments. After they have been passed over by the officials in the central office, they are collected and arranged on a table in the check room at the entrance to the plant yard, where the men pass in going to and from their daily toil. In this position, the papers readily come under the attention of the employes and attract their interest. The latest information pertaining to all phases of the iron and steel and mechanical industries is placed at their disposal. The rules provide that the men may read the papers in the check room or take them home for a brief period, with the understanding that they must be returned, because a file of these publications is kept by the works.

It has been demonstrated in this case that where the employers provide ready access to instructive and useful literature, it is taken advantage of freely by the men in a spirit of team-work and self-help. So successful has been the experiment, and so widely have the men availed themselves of the selected reading thus placed at their disposal, that the welfare department of the United States Steel Corporation is recommending the adoption of the same or similar plans in all the other plants of that great business organization. Other employers well might utilize the experience of this large manufacturer, to the advantage of both themselves and of those in their service.

As the debate on the Clayton anti-trust bill proceeds in the Senate, efforts to make its provisions more severe do not meet with much success. Last Thursday, Senator Reed's motion to attach a jail penalty to the "holding company provision" of the bill was defeated and the Senate likewise voted against a jail sentence, which it was proposed to attach to the interlocking directorate section. It is true that in the provision prohibiting the organization of a holding company or the purchase of stock by one corporation in another engaged in interstate commerce when the effect of such an action may be substantially to lessen competition, the word "substantially" was eliminated by the Senate. But that merely gives more discretion to the courts.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for September, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Aug., 1914.	Average for June, 1914.	Average for Sept., 1913.
Bessemer pig iron, Pittsburgh..	14.90	$14.90	$14.90	$16.65
Basic pig iron, Pittsburgh.....	13.90	13.90	13.90	15.09
No. 2 Fdy. pig iron, Pittsburgh.	13.90	13.90	13.90	14.90
Northern No. 2 Fdy., Chgo....	13.50	14.00	14.25	15.00
Lake Superior Charcoal, Chgo..	16.00	15.75	15.75	15.00
Malleable Bessemer, Chicago....	13.50	14.00	14.25	15.00
Southern No. 2, Birmingham....	10.00	10.00	10.38	11.00
Southern Ohio No. 2, Ironton..	13.00	13.25	13.50	14.00
Basic, eastern Pa.....	14.00	14.00	14.00	15.25
No. 2X Virginia furnace.....	12.50	12.50	12.75	13.00
No 2X Foundry, Philadelphia...	14.75	14.75	14.75	16.00
Ferro mang., Balti.....	100.00	125.00	37.50	55.00
Bessemer billets, Pbgh. & Ygn..	21.00	20.00	19.75	25.00
Op. h'th sh. bars, Pbgh. & Ygn.	22.00	21.00	20.75	25.62
Bess. sheet bars, Pbgh. & Ygn..	22.00	21.00	20.75	25.62
Op. h'th billets, Pbgh. & Ygn..	21.00	20.00	19.75	25.00
Steel bars, Pittsburgh.....	1.20	1.17½	1.11½	1.40
Iron bars, Philadelphia.....	1.25	1.20	1.20	1.37
Steel bars, Chicago.....	1.38	1.30	1.28	1.58
Tank plates, Chicago.....	1.38	1.36	1.28	1.58

	Today's prices.	Average for Aug., 1914.	Average for June, 1914.	Average for Sept., 1913.
Structural shapes, Chicago.....	$1.38	$1.36	$1.28	$1.63
Iron bars, Cleveland, local del'y.	1.20	1.20	1.22½	1.41
Iron bars, Chgo. mill.....	1.07½	1.07	1.10	1.35
Beams, Pittsburgh	1.20	1.17½	1.10	1.41
Beams, Philadelphia	1.30	1.30	1.25	1.55
Tank plates, Pittsburgh.....	1.20	1.16	1.11½	1.40
Tank plates, Philadelphia.....	1.30	1.30	1.25	1.55
Sheets, blk., No. 28, Pittsburgh.	1.95	1.88	1.82	2.12
Sheets, blue an., No. 10, Pbgh..	1.40	1.37½	1.35	1.61
Sheets, galv., No. 28, Pbgh.....	2.90	2.85	2.77	3.15
Wire nails, Pittsburgh.....	1.60	1.55	1.50	1.65
Connellsville fur. coke, contr....	1.75	1.80	1.85	2.44
Connellsville fdy. coke contr....	2.35	2.36	2.40	3.00
Heavy melting steel, Pbgh.....	11.50	11.50	12.00	12.50
Heavy melting steel, east'n Pa..	11.00	10.50	10.75	12.00
Heavy melting steel, Chgo.....	9.50	9.75	9.75	10.50
Heavy cast, eastern Pa.....	12.25	12.25	12.50	13.25
No. 1 wrought, eastern Pa.....	12.50	12.50	12.50	14.50
No. 1 wrought, Chgo.....	8.50	8.75	8.88	10.25
Rerolling rails, Chgo.....	11.25	11.25	11.25	12.00
Car wheels, Chgo.....	10.75	11.00	11.00	12.50

(For Additional Prices See Page 454.)

Furnaces Take a Firm Position

In Quoting for Delivery Next Year—Wheeling Company in Market for 20,000 Tons—Very Little Activity in Most Centers

Cleveland, Sept. 1.—An illustration of the strong opposition of furnace interests to sell for delivery into next year was furnished during the past week when the Wheeling Mold & Foundry Co. sent out an inquiry for 20,000 tons for delivery during the next 18 months and was willing to pay about $13.50, valley, for No. 2 foundry. No seller in this district would consider that price and there was great reluctance for quoting for delivery after Jan. 1. Hence the buyer made no progress. Aside from this inquiry on the sale for 500 tons valley iron to a Cleveland consumer and a moderate tonnage for a Toledo furnace, no transactions are reported.

Few Sales at New York

New York, Sept. 1.—A Phillipsburg, N. J., pipe maker has closed for 2,000 to 3,000 tons of No. 2 plain for shipment over the remainder of the year. The business was placed with Lehigh Valley makers at a price at or slightly under $13.50, delivered. The freight rate is 35 cents from these furnaces. A Newark, N. J., consumer has closed with an Eastern Pennsylvania maker for 800 to 1,000 tons of No. 2 plain at about $14.50, delivered. These two transactions represent, in connection with some scattered carload orders, practically all the business done in the metropolitan pig iron market the past week. The American Malleables Co. and the Southern Car Wheel Co., associated companies of the American Brake Shoe & Foundry Co., whose inquiries for 6,000 to 7,000 tons of malleable and other grades, were reported disposed of, have not placed this business, it develops, but temporarily have withdrawn these negotiations. The International Steam Pump Co. is inquiring for 400 tons of foundry for Holyoke, Mass. While low prices, notably $14.25, tidewater, for No. 2 plain, recently still have been quoted by eastern Pennsylvania makers, there is a tendency to adopt higher schedules. A leading Lehigh Valley maker who has been selling at $14.50, tidewater, or lower for No. 2X, has advanced to $14.00, furnace, or $14.70, tidewater. Forward inquiries for iron received in this territory, have not been very numerous to date. Some general requests for prices, however, have been received from Russia and Italy during the past week.

Slowness at Philadelphia

Philadelphia, Aug. 31.—Slow action in the pig iron market in eastern Pennsylvania has not undergone any change and the situation continues as it has been for a number of weeks. Consumers are not willing to pay the advances which the furnaces are asking for forward delivery because of future uncertainties, and sales refer largely to uncovered early needs which are not of large extent. Prices still manifest more or less doubt, but it is evident they embrace considerable irregularity. A New Jersey cast iron pipe maker figuring on 2,000 to 3,000 tons of No. 2 plain for early delivery, offered $13.75, delivered, to one maker, which was refused, and is understood to have received a lower quotation. This consumer's plant is located close by several furnaces. A Delaware river pipe maker asks 2,000 tons of No. 3 and forge for September and the Baldwin Locomotive Works is in the market for 1,000 tons of 1.15 to 1.20 silicon iron for last quarter. Another inquiry for 1,500 to 2,000 tons of mixed grades is current. There is some question how much iron the Pennsylvania railroad has closed for against its inquiry of 3,000 to 4,600 tons of charcoal and coke iron for Altoona and Pittsburgh. It is known to have placed some of the charcoal iron and the coke iron is reported, though not confirmed, to have gone to central and western Pennsylvania makers. There is practically no demand for steel-making

(*For complete prices see page* 454.)

iron, either basic or low phosphorus. The A furnace of the Warwick Iron & Steel Co., at Pottstown, Pa., is being blown out, leaving one stack in blast. Several eastern Pennsylvania furnaces continue to consider the advisability of making ferro-manganese for the market.

Quiet at Pittsburgh

Pittsburgh, Sept. 1.—The pig iron market in western Pennsylvania and eastern Ohio shows no signs of activity, and dealers do not expect to see any change in the situation until the future can be more accurately defined. The Pennsylvania railroad has closed on its inquiry for from 1,500 to 3,100 tons of coke and charcoal iron for shipment to its Altoona shops the remainder of the year. Central Pennsylvania stacks will furnish the coke iron, and the charcoal iron will be shipped by Lake Superior furnaces. An inquiry for 500 tons of Bessemer for Ohio shipment is reported. A cast iron pipe maker in an adjoining district is negotiating for 4,000 tons of gray iron and foundry grades.

Shipments Heavy at Buffalo

Buffalo, Sept. 1.—Placement for the week amounted to about 7,000 to 8,000 tons. One order was for 3,000 tons of foundry grades for a Central New York foundry in the specialty business. Another was for 1,500 tons, foundry grades, going to a melter in the eastern part of the state. The other sales were for carloads up to 200 tons.

Shipments from all of the furnace interests of the district continue in good volume against contract.

Outside of the sales reported the market is reported as generally slack, lacking interest on the part of both buyers and sellers.

The price situation presents a wide range of quotations according to the interest in the market to place the business. One furnace interest is quoting $13 on No. 2X foundry. Others quote as high as $14.

There is an unconfirmed report that 3,000 tons of malleable has been sold to the Buffalo branch of the American Brake Shoe & Foundry Co. This announcement is said to be premature.

Malleable Inquiry

Cincinnati, Sept. 1.—The Massillon Foundry & Machine Co., Massillon, O., is inquiring for 4,000 tons of foundry iron for last quarter delivery. A southern Michigan melter is in the market for 1,000 tons of malleable iron and a central Ohio manufacturer wants 500 tons of Bessemer iron. Inquiries from the Columbus Malleable Iron Co., Columbus, O., and the American Malleable Iron Co., Marion, O., are still unclosed. Of the above inquiries, the one from Michigan is the most likely to be closed soon, although it is expected that the others will buy at least part of the tonnages mentioned.

The market is very sluggish and the general report of dealers is that the tonnages sold during the past week have been extremely light. Southern iron is quoted at from $10 to $10.50, Birmingham basis, for No. 2 foundry, the lower priced iron being obtainable from either Tennessee or Alabama. Southern Ohio No. 2 foundry and malleable are quoted at from $13 to $13.50, Ironton basis, with the lower figure in the majority.

Shading at Chicago

Chicago, Sept. 1.—Comparatively small inquiry and still smaller sales mark the pig iron market in Chicago, and such sales as are being made are largely at a lower price than the quotation of $14, Chicago furnace, maintained for several months. The influence of the reduction in freight rates from Birmingham to Chicago is believed to be a large factor in forcing these prices. No. 2 foundry and malleable have been contracted at $13.50, Chicago furnace, although malleable is somewhat stronger than foundry.

Some tentative inquiry is being received for first quarter delivery, but so far not many sales have resulted. Prices for this delivery are being quoted at 50 cents higher than for fourth quarter.

Southern iron continues firm at $10.25, Birmingham, but sales are practically unknown except small tonnages here and there.

Few St. Louis Sales.

St. Louis, Sept. 1.—There is virtually no inquiry for pig iron in the St. Louis market, and sales last week were confined to carload and 100-ton orders, one order running as high as 200 tons, nearly all of which was northern iron. A few cars of 8 to 12 per cent silicon iron also changed hands. Southern No. 2 is quoted at $10.50 to $10.75, Birmingham basis. Northern iron is held at $14, Chicago furnace, and $13.50, Ironton.

"Tariff Off Backs"

Birmingham, Ala., Aug. 31.—The Birmingham pig iron market has been quiet during the past week. Inquiry is good, iron makers state, and they are feeling well satisfied over conditions.

No. 2 southern is now being quoted at $10.25 for September shipment and $10.50 for last quarter delivery by all of the companies with the exception of one, which is still making a $10 quotation. Estimated total sales since Aug. 1 or the last week in July are 200,000 tons.

Iron men say that no effect of the war has been noted yet and are inclined to disagree now on what the final effect will be. One or two of them are getting pessimistic while the rest are very optimistic. "While the war has had no direct effect on us yet," said one big maker, "there are at least no imports being made and we have the tariff off our backs and that is a whole lot to be thankful for."

Several iron makers have stated during the week that no more furnaces will be blown in by their companies until better prices prevail.

(*For complete prices see page* 454.)

Shipments

From British Furnaces Decline Under War Conditions

New York, Sept. 1.—Pig iron shipments from Great Britain have fallen off considerably, as result of the war, according to statistical reports as of Aug. 20, just received. The shipments of iron from the Middlesbrough district, for the month up to Aug. 20, only were 14,110 tons, against 57,642 tons for the corresponding period in 1913, a loss of 43,532 tons. Middlesbrough shipments this year to Aug. 20, were 706,756 tons, compared with 749,157 tons in 1913, a loss of 42,401 tons. In Scotland, the movement of iron for the week ended Aug. 15, was 366 tons, compared with 3,851 tons a year ago, and in the Cumberland district, 820 tons, as against 2,611 tons in 1913. Scotland deliveries this year to Aug. 15, were 138,613 tons, a loss of 18,835 tons, and from Cumberland, 148,757 tons, a loss of 25,695 tons.

Middlesbrough stocks on Aug. 20 were 90,892 tons, an increase of 3,109 tons from the preceding week, but a decline of 47,772 tons since Jan. 1. A year ago the Middlesbrough stocks were 186,186 tons. Cumberland stocks were unchanged at 3,585 tons, compared with 8,958 tons on Jan. 1 and 19,761 tons on the corresponding date in 1913. Furnace operations in the Middlesbrough district as of Aug. 20, were 72 stacks, compared with an equal number the preceding week and 89 for the corresponding period in 1913. In Scotland, they were 55, 66 and 88, and in Cumberland, 20, 19 and 24, respectively.

George D. McIlvaine, secretary of the National Pipe and Supplies Association, Pittsburgh, has returned from a month's vacation in Canada.

To Increase Ferro Production

Various Propositions for Making Tin Alloy—Cargoes of Russian Ore En Route to Germany Diverted to United States

New York, Sept. 1.—Interest in ferro-manganese centers in the plans that are being laid for the extension of the home manufacture of this alloy. At least one manufacturer, in addition to the American Manganese Co. at Dunbar, Pa., now is booking orders for domestic ferro-manganese and an independent steel company is about to put one of its furnaces upon this alloy, principally for its own needs. Other propositions for the making of merchant ferro-manganese continue under consideration both by eastern and southern furnaces.

An eastern alloy manufacturer which just has entered the field as a seller of domestic ferro-manganese to be made in electric furnaces already has taken some orders. An eastern Pennsylvania steel maker has placed several hundred tons for shipment over the next several months with this maker at a price of $100, seaboard.

In view of the plans being perfected for increased domestic production of ferro-manganese, there has been some further activity in the manganese ore market. At least two additional cargoes of Russian ore which were enroute to Germany, have been diverted to this country and sold upon the basis of 25 to 26 cents per unit of manganese at tidewater. It is reported that there have been further sales of Brazilian ore. Recent sales of foreign manganese ore to eastern steel makers and to other prospective purchasers of ferro-manganese have totalled not less than five or six cargoes or 30,000 to 35,000 tons. An eastern ore merchant is understood to be offering in the market 30,000 tons additional.

Shipments of English ferro-manganese against contracts now are beginning to move for the first time since the war. The steamer Dominion, with 600 tons, arrived the past week at Philadelphia. The steamers Graciana and Quernmore with 1,500 to 2,000 tons, are understood to be afloat and the Haveford is expected to sail this week. Most of these shipments are being made under the condition of the buyer assuming $2.50 per ton, to cover war risks and increased freight, as proposed by several of the leading English sellers. One leading English seller, however, now is notifying his customers that shipments by Nov. 1 can be resumed only by buyers paying $15 per ton, in addition to the contract price.

Selling by domestic makers has been the principal activity of the market in the week. It now is understood that the American Manganese Co. has sold up all the 40 per cent material from the ore in hand. Sellers of English ferro-manganese report some prompt sales of 5 and 10-ton lots at $100 and $110, seaboard.

Foreigners Want Spiegel

New York, Sept. 1.—Inquiries have been received in this country for 8,000 to 10,000 tons of spiegeleisen for shipment to foreign countries whose supplies have been interfered with by the war. It is rather unusual for foreign consumers to seek spiegeleisen in this country. In the past, this country generally has been a buyer, rather than a seller, abroad. Some buying of domestic spiegeleisen to home consumers continues under way, although the movement is not as active as it was several weeks ago. Inquiries for about 2,000 tons are pending. Domestic spiegeleisen prices are unchanged.

Not Embargoed

New York, Sept. 1.—Renewed reports during the past few days that the English government has placed an embargo upon ferro-manganese proved to be without foundation according to direct cable advices received from English manufacturers. While it has been suggested that the government place such an embargo and the matter has been given considerable consideration, the opinion is expressed in well-informed circles that no such action finally will be taken. It is understood, however, that certain metals have been embargoed by the English government.

Less Acute at Pittsburgh

Pittsburgh, Sept. 1.—Consumers in this district are not nearly so alarmed over the ferro-manganese situation as a week or 10 days ago, although expressions are heard that the market will become excited again before the end of the year, when present stocks will be exhausted. A 1,000-ton lot of English material was offered at about $84, seaboard, a few days ago for shipment last quarter. So far as can be learned, no sales have been made this week in the immediate district. The Dunbar furnace, which will make ferro-manganese from Cuyuna range ores, will operate on basic iron ore for about a fortnight. The stack will be in operation in early October, according to plans.

(*For complete prices see page* 454.)

Cast Pipe

In Limited Demand—Financial Conditions a Factor

New York, Sept. 1.—The eastern cast iron pipe market is in a rather quiet stage, but makers expect a better tonnage to come out when financial conditions are more settled. They also are looking forward to considerable export trade, when that market finally is opened. The city of Philadelphia has divided 4,000 tons of 4 to 20-inch pipe and specials among the United States Cast Iron Pipe & Foundry Co., R. D. Wood & Co. and the Standard Cast Iron Pipe & Foundry Co. R. D. Wood & Co. have taken 1,000 tons for Riverhead, L. I., at $21.55 for the 4's and $20.85, for the 6, 8, 10 and 14's. The freight is $2.40. The United States Cast Iron Pipe & Foundry Co. has been awarded 1,275 tons of 4 to 12's for the Bridgeport Hydraulic Co. The Portland Water District, Portland, Me., is inquiring for 1,000 tons of 20-inch and Havana, Cuba, is in the market for 500 tons. Ruling prices still show close figuring among eastern foundries where approximately $18.50, on 6-inch pipe is being done by some shops.

Slow at Chicago

Chicago, Sept. 1.—Last week was unusually devoid of features in cast iron pipe, the only tonnage placed in the west being 200 tons at Hamilton, O., which was awarded to the Glamorgan Pipe & Foundry Co. No new business has appeared recently and the only contracts pending are those already mentioned. Routine and contractors' business continues in satisfactory volume and makes up the backbone of bookings.

The Ayer & Lord Tie Co., Chicago, has closed for a large quantity of creosoted blocks for shop floors for the Continental Gin Co., Dallas, Tex., manufacturer of cotton milling machinery. This is the first considerable order for this class of goods from the south and is regarded as an entering wedge for business in that part of the country.

The National Implement and Vehicle Association will hold its annual convention Oct. 21 to 23 at the Congress hotel annex, Chicago.

Inquiry for Crude Steel

Includes Round Tonnage for English Account—Full American Prices Quoted

Philadelphia, Aug. 31.—Inquiries for 15,000 to 20,000 tons of billets, sheet bars and slabs have been put before sellers in this district for English account. Whether the steel is wanted for consumption in Great Britain is not certain. One lot of 10,000 tons of billets is included and also an inquiry for 3,000 tons of billets. Some of the billets are 2⅜-inch sizes. Domestic makers who are pursuing these inquiries have been quoting full home prices, but no orders have been taken, as transportation facilities still are uncertain. One maker is stipulating that September delivery must be specified. Domestic buyers are putting out a scattered inquiry and the tonnage is not large. Rerolling steel continues to be quoted at $22.40 to $23.40, Philadelphia. Some small orders have been entered by eastern mills at higher than $23.40, delivered.

Holding Firmly

Pittsburgh, Sept. 1.—Billets and sheet bars are being firmly held on the basis of $21 and $22, makers' mill, respectively, at Youngstown and Pittsburgh, and it is not believed that those figures could be shaded. Some mills are refusing to sell at those prices for anything but immediate delivery. Demand for sheet bars has been fairly heavy. Inquiries continue to come out for foreign shipment, but no sales have been made so far as can be learned. A couple of tonnages of wire rods have been sold for shipment to England, involving more than 1,000 tons, at about $27, Pittsburgh. Demand for wire rods for foreign delivery has been heavy.

Need More Information

Cleveland, Sept. 1.—Inquiries for considerable tonnages of billets including one for 50,000 tons reported in these columns last week as having been received in the eastern territory, have been received in Cleveland within the past few days. No quotation was made, but a letter was sent in reply asking for further particulars as to time of delivery and other conditions.

August Better Than July

Ashland, Ky., Sept. 1.—The market is slow and although it shows no improvement over that of last week, business done during August will be in excess of that for July. The advance of 50 cents per ton, which occurred about two weeks ago on both billets and wire rods, is holding firm and quotations are now $20.50 for the former and $25.50 for the latter, both Ashland basis.

Tubular Goods Inactive

Pittsburgh, Sept. 1.—The market for iron and steel pipe in western Pennsylvania and eastern Ohio offers nothing of interest. There has been no new demand of consequence, and no large orders have been placed in the open market. Curtailed operations in the oil fields continue to have an unfavorable effect upon the market for line and drive pipe, tubing and casing. Boiler tubes are quiet and prices are uncertain and irregular.

Nuts and Bolts

Cleveland, Sept. 1.—Inquiries for nuts and bolts from Europe have not developed into actual orders and prices are unchanged.

Sheet Prices Are Firm

And Activity in Eastern Territory Continues—Dull in Central West

Chicago, Sept. 1.—Steel sheets are distinctly strong at present quotations of 2.18c and 3.18c, Chicago mill, for No. 28 gage black and galvanized, respectively. It is believed that some makers are asking even higher than this quotation, but are not booking tonnage, as the lower price is so widely available. Makers of sheets are not anxious to obligate themselves for future deliveries and practically all business being taken now is for prompt delivery with every expectation of higher prices ruling during fourth quarter.

Holders of contracts at quotations below those of today are specifying liberally, and as almost all of the contracts will expire shortly, effort is being made to take out tonnage before expiration of the agreements.

Sheets Good in East.

Philadelphia, Aug. 31.—Continued buying of sheets at the advanced price of 1.65c, Philadelphia, or 1.50c, Pittsburgh, for No. 10 gage blue annealed is reported by leading eastern Pennsylvania makers. The sheet business, in fact, proves to have been one of the most active spots of the situation. The Alan Wood Iron & Steel Co. is operating its Conshohocken, Pa., plant at full capacity.

Hold Position

Pittsburgh, Sept. 1.—Specifications against contracts for steel sheets in August exceeded those received the preceding month by a broad margin, according to reports from leading makers, but the market has not changed its position the last few days. On contract tonnage, 2c and 3c is being asked for No. 28 gage black and galvanized products, respectively, but material is going at $1 and sometimes $2 a ton less than those levels for immediate delivery.

Firm at Cleveland

Cleveland, Sept. 1.—The sheet market in the Cleveland district is firm. It recently advanced quotations. Although it is not active, prospects are considered favorable.

Continue Active

Cincinnati, Sept. 1.—Sheet mills in this district are well satisfied with the market. Activity is confined mostly to new orders, as mills were refusing to sell for contract delivery until about two weeks ago, therefore making specifications on old contracts at a minimum at the present time. Prices are unchanged but are a little firmer at 2.15c for black sheets No. 28 gage, 3.15c for galvanized No. 28 gage and 1.60c for blue annealed No. 10 gage, all Cincinnati basis. Mills are generally refusing business for shipment beyond Oct. 1, and are predicting another advance by fall.

Col. H. P. Bope, vice president and general manager of the sales of the Carnegie Steel Co., Pittsburgh, has returned from the rifle range at Mt. Gretna, Pa., where he spent a week in the capacity of major of ordnance attached to the Second brigade of the Pennsylvania National Guard.

Hilb & Bauer, Cincinnati, O., wholesale dealers in old materials, moved their general offices to 611-615 Union Trust building, that city.

(*For complete prices see page* 454.)

Full Price for Bars

Paid in East for Thousand Tons—Price of Norway Iron Advanced $5 Per Ton

Philadelphia, Aug. 31.—A contract sale of 1,000 tons of steel bars for last quarter shipment has been closed in this district by a large middle western maker at 1.35c, delivered, or 1.20c, Pittsburgh. This appears to be a firm level for new business, but there is very little of it moving. Specifications continue good, though there were some concellations of August tonnage which had not been ordered in. A Lebanon, Pa., buyer asks 400 to 500 tons of bars and a western Pennsylvania concrete bar mill took several hundred tons for the Blabon building in this city.

Specifications Fair

Pittsburgh, Sept. 1.—Specifications for steel bars came out in fairly satisfactory volume last month, some mills reporting an improvement over July, but the immediate future offers little or nothing of encouragement. Specifications have fallen off the last few days, and no new demand is reported. Quiet is attributed to unfavorable influences of the European war. Bar iron has showed slight improvement, but prices have not been tested.

Steel Bars Move Well

Chicago, Sept. 1.—Although comparatively little new business in steel bars is being booked by makers, specifying on existing contracts is continuing in satisfactory volume.

Shafting, Hoops, Bands

Pittsburgh, Sept. 1.—Hoops and bands have stiffened moderately the last couple of days, and reports of material going at less than 1.30c and 1.20c are less frequent. Shafting is being held at 66 per cent off, but sales are light.

Iron Bars Steady

Chicago, Sept. 1.—No change in the demand and output of iron bars has developed in the past week and prices remain at practically 1.10c, Chicago mill, as before. Operations of mills are practically the same and orders are in small tonnages widely scattered.

Higher for Last Quarter

Buffalo, Sept. 1.—A Buffalo sales office reports that users who had not closed for their requirements for last quarter are booking their needs at an advance of $1 over current quarter prices. One sale for a large tonnage, for delivery over last quarter and the first of 1915, was booked by a local agency at better than present prices. Nothing is being accepted for immediate delivery below 1.20c, base. Users seem to expect a further advance in prices.

Norway Iron Advanced

Cleveland, Sept. 1.—Cleveland sellers of Norway iron have advanced their price to $3.50 for 100 pounds, an advance of $5 per ton since war was declared by England. The Cleveland iron mills are running intermittently and prices have not improved.

Foreign Plate Inquiry

Steel Coming to Mills—New Business Light but Prices Are Firm

Philadelphia, Aug. 31.—Foreign inquiries have furnished the principal tonnage presented before eastern Pennsylvania plate makers the past week. A single mill reports six inquiries received from England in the week totaling a considerable tonnage. No orders have been taken from these negotiations, but eastern makers are hopeful of important business in time. New plate business has been on a smaller scale the past week compared with the preceding period. Orders against old contracts have been sufficient to enable one mill at least to operate very favorably. Structural plates have been the most active. Bidding on seven barges requiring 2,800 tons of plates by eastern shipyards has been deferred indefinitely. A lot of 5,000 car plates for an eastern builder still is pending. A request for 600 to 1,000 tons for tunnel shields in New York City is up. Early shipment plates may still be had in the east for eastern delivery at 1.30c, Philadelphia, or 1.15c, Pittsburgh. For forward delivery 1.20c, Pittsburgh, is minimum.

Inquiry From Sweden

Cleveland, Sept. 1.—An inquiry for 800 tons of plates, shapes and bars for delivery in Sweden has been received. This consumer usually obtains his finished steel material in continental markets, but was unable to do so under present war conditions.

Demand Heavy; Sales Light

Pittsburgh, Sept. 1.—Demand for plates for shipment to foreign countries continues to come out, but no tonnages for Europe have been sold in this district, so far as can be ascertained. Although no general rule applies to methods of quoting for export trade, local makers have been asking $1 a ton above the domestic market for shipment to foreign countries. Specifications came out in fairly good volume last month, but new buying has been decidedly light, and indications are that September will be a very quiet month in all branches of the trade. Specifications have fallen off slightly the last few days, and no inquiries of importance are before the trade.

Prices Firm.

Cincinnati, Sept. 1.—Plates and shapes are firm at from 1.35c to 1.40c, Cincinnati basis, and business during the past week has been more satisfactory than at any time last month. Tonnage of sales for the last half of August was considerably above that of the first two weeks of the month. Specifications are good on both old and new orders.

Demand Steady

Chicago, Sept. 1.—Although no large demand for steel plates has developed, there is a steady call for plates in tank work and also for railway car building, which keeps this product moving at a slightly lower level than other finished steel products. Considerable less car buying on the part of railroads than was expected has had the effect of keeping the demand for plates much lower than makers anticipated, but other factors have entered to make up for this in some degree. Plates continue at 1.38c, Chicago, without shading being noted.

R. L. Brown has resigned as sales agent for the Barney & Smith Car Co., Dayton, O., and has associated himself with the Hotchkiss-Blue & Co., Ltd., Railway Exchange building, Chicago.

The Minnesota Steel Co. blew in its No. 1 blast furnace at South Chicago, Aug. 27, and will blow out its No. 2 stack during the week of Sept. 1. The latter will be relined this fall.

(*For complete prices see page* 454.)

Old Material is Firmer

In Eastern Territory, but Soft at Chicago and Dull in Most Centers

Philadelphia, Aug. 31.—Underlying conditions in the eastern Pennsylvania old material market continue to display greater firmness though trading is not active, due in part to limited quantities of scrap being offered by sellers. Heavy melting steel in lots of less than 1,000 tons continues to bring $11, delivered eastern Pennsylvania, two works having paid this in the week. Other leading consumers in this district cling to their offers of $10.50, delivered. Dealers continue to bid up certain grades. One principal buyer of this grade circularized the trade offering $10.50, delivered, for wrought pipe, but a large dealer has advanced his price to $11, delivered. Some carload sales of low phosphorus at $14.25, delivered, are reported. August railroad lists are lighter than usual. Italy, which has been a frequent buyer of eastern scrap in times past, has put out some inquiries in this district for crop ends and other grades due to its supplies from England and Germany being interrupted.

Still in Dumps

Pittsburgh, Sept. 1.—The old material market in western Pennsylvania remains dull, and there are no indications of any immediate change in the situation. The sale of a round tonnage of heavy melting steel at $11.50 is noted, but jobbers report no demand for other grades. The Pennsylvania railroad is asking bids on material at its several shops in this district.

Cleveland Old Materials

Cleveland, Sept. 1.—While no embargoes on scrap are reported at plants in this district, mills are holding back shipments and do not seem desirous of much more material over this year. Dealers report a plentiful supply is available at fairly low prices, but no market can be found. Some sellers seem less cheerful than they were from three to six weeks ago. Prices are, as a rule, unchanged.

Soft at Cincinnati

Cincinnati, Sept. 1.—Iron and steel scrap prices are soft and show a tendency to fluctuate over a wide range. Demand is at a minimum but offers are heavy because of the large accumulation both in dealers' yards and in the rural districts. All rolling mills in this district, which are the largest users of scrap, have requested that shipments be withheld until the stocks they already have on hand are used up. No changes in prices are possible because of the lack of transactions to form a basis of comparison.

Market at Standstill.

Chicago, Sept. 1.—Absolutely no demand exists for iron and steel scrap in the Chicago market and dealers forced to dispose of part of their holdings are compelled to take almost any offer. Some holders have been forced to liquidate to some extent and users have been able to pick up some bargains which tempted them, although they were not in need of tonnage. Several unusually long lines of scrap are being held and for the most part represent a cost considerably higher than present nominal quotations. Two unusually large railroad lists are before the market this week. The Baltimore & Ohio offers 10,800 tons, of which 2,500 tons are No. 1 steel rails. The Chicago & North-Western offers 6,200 tons, which includes 1,000 tons of No. 1 railroad wrought, 500 tons No. 1 cast, 400 tons old iron axles and 400 tons of old iron rails.

More Hopeful at St. Louis

St. Louis, Sept. 1.—Dealers in scrap are beginning to feel that prices soon will follow the advance in finished steel products. In fact, there is a much better feeling concerning conditions, although prices have not been changed. The Missouri Pacific railroad is in the market with a list of 1,450 tons of scrap, and the M., K. & T. has one on the market for 2,500 tons.

Warehouses

Enjoy Active Business at Chicago—Same Improvement Elsewhere

Chicago, Sept. 1.—Demand for products from store has been unusually strong for the past week, although structural materials have been somewhat less active than usual. This defection has been more than made up by increased call for other products, plates, shapes and bars being most active. This undoubtedly comes as a result of steel mills being unable to give as prompt delivery as early in the summer, thus throwing the demand for immediate delivery stock into the hands of warehousemen.

Although mill prices on finished steel products have advanced considerably recently, no indications exist of a forthcoming advance on these materials from store. The recent advance in sheets is being maintained.

Adjustment at New York

New York, Sept. 1.—Some adjustment in the price of light plates from warehouse in this district, has been made to conform to the recent advances named in sheets. Otherwise, there is no change in jobbers' schedules about the metropolis. Warehouse business at New York and vicinity is a little better in volume and on the whole, of fair proportions.

Slight Improvement

Cleveland, Sept. 1.—Warehouse business in the Cleveland district shows slight improvement, but the tonnage sold in August exceeds that of July by only a few tons. Sheet prices are somewhat firmer.

Transactions Decrease.

Cincinnati, Sept. 1. — Warehouse business has dropped off a little after several weeks of fair activity. Mills have been soliciting small orders recently that have usually gone to the warehouses and demand for building materials has fallen away. Prices are holding and show no tendency to change.

Sheet Prices

St. Louis, Sept. 1.—Minimum prices from store have been withdrawn and prices now are firm at 2c for No. 10 blue annealed, 2.55c for No. 28 black and 3.55c for No. 28 galvanized.

Tin Plate

Not so Nervous—Heavy Specifications Have Been Filed

Pittsburgh, Sept. 1.—The flurry in the tin plate market appears to have disappeared, although the situation will continue to be regarded as serious until shipments of block tin can be guaranteed. The market for tin at New York has been quiet, and indications are that normal conditions soon will prevail.

Heavy Specifying

Cleveland, Sept. 1.—The heaviest consumers of tin plate have specified liberally during the past few days. Very little new business is pending.

The Cambria Steel Co., Johnstown, Pa., will hold its third annual first-aid meeting, Sept. 5. Twelve judges have been appointed to decide the winners of the various contests.

(*For complete prices see page* 454.)

Worst Month

On the Lakes—Many Vessels Sent to the Docks

Shipments from a couple of ore docks are still lacking, but returns from the others indicate that the August movement will not be 6,000,000 tons, as was expected. It will not be much if any greater than the July movement, which was 5,784,514 tons. Practically all of this ore has been moved in shippers' vessels and dispatch has been very rapid. A few ore sales continue to be made, but not enough to have any stimulating influence. Vessel men are all agreed that August was the worst month that they have ever experienced and scores of ships had to go to dock. No improvement is expected in this trade during the remainder of the year and the probability is that the ore movement will close earlier than usual.

Foreign Cargoes Arrive

New York, Sept. 1.—Occasional cargoes of trans-Atlantic iron ore continue to arrive at Philadelphia. Two cargoes from Spain and one from Sweden came in during the past week. These shipments represent deliveries against old sales, as there is no buying of foreign ore by eastern furnaces at the present time.

Coke Prices

Reflect Decreased Demand—One Valley Furnace Buys

Pittsburgh, Sept. 1.—The Connellsville coke market remains in a state of lethargy, and prices are beginning to reflect weakness. A valley blast furnace interest has taken 5,000 tons of September fuel at $1.75, ovens, and could have covered for a long period at the same price. Spot furnace coke is weak at $1.70 ovens although leading operators are refusing to sell at less than $1.75. Foundry coke is quiet and prevailing quotations are weak. The *Connellsville Courier* for the week ending Aug. 22, says production was 259,665 tons, an increase of 2,325 over the week before.

Market Drags

Cincinnati, Sept. 1.—The coke market is persistently dragging along without any change in prices or any improvement in the situation. Sales are scattered and very small on both furnace and foundry grades. Blast furnaces in southern Ohio are well covered with the possible exception of a few in the Ironton district which are reported about ready to blow in. Foundries in this district are operating at about 35 per cent of capacities and are buying in small lots from time to time in order to take advantage of concessions granted on spot shipment fuel.

A Few Carloads

St. Louis, Sept. 1.—A few carloads of coke were sold in the St. Louis market last week at prices ranging from $2.50 to $2.75 for 72-hour Connellsville grades, and $2.75 to $3 for New River, Virginia grades, which are beginning to go into the St. Louis territory.

Wire Orders

Are Few, but Specifications are Coming in Fair Volume

Pittsburgh, Sept. 1.—The market for wire products in western Pennsylvania and eastern Ohio is quiet so far as new business is concerned, and products have not yet been established on the basis of $1.60 a keg for nails, although material is not being offered for less than that figure, so far as can be ascertained. Specifications are coming out in fairly good volume.

Prices Maintained

Cleveland, Sept. 1.—Jobbers have specified heavily during the past week, but manufacturers are rather slow in forwarding their specifications. The recent price advance is being well maintained.

Large Contracts

Awarded at Chicago—Little Activity in Other Centers

Philadelphia, Aug. 31.—For prompt delivery in eastern territory, eastern Pennsylvania structural shape makers still will accept 1.30c, Philadelphia, or 1.15c, Pittsburgh. One leading eastern mill is naming 1.35c, Philadelphia, or 1.20c, Pittsburgh, for acceptance in 10 days and specifications in 30 days, and this policy is typical of eastern makers at present. It is apparent, however, that the new business offered is of limited proportions and lettings continue few. There is a free drawing in of the tonnage under contract and the mills, as a result, are in a comfortable position at this time. The government has offered a coaling station at Cristobal, Panama Canal, requiring 4,500 tons.

Quiet at Pittsburgh

Pittsburgh, Sept. 1.—Fabricating interests in western Pennsylvania are experiencing decidedly dull trade conditions, and no improvement in the situation is expected until the future can be more clearly defined. No contracts of importance have been taken. Shapes are being held at 1.20c, and that figure appears to represent the market at this center, although reports of shading are heard in the east. Inquiries for foreign shipment continue to come out, but no actual sales are noted.

Specifying Freely

Buffalo, Sept. 1.—In shapes and plates, specifications continue to come in freely against contracts. Mills and agencies say the specifying for August about equals that for July and they are canceling all unspecified tonnages on the quotas for August.

Large Tonnage Pending

Buffalo, Sept. 1.—Fabricators in this district have a large tonnage of business upon which they are figuring, but few of the prospective jobs are materializing into orders at this time.

Shops Fairly Busy

Cleveland, Sept. 1.—Cleveland shops are fairly busy, most of them having enough work on hand to employ their capacity pretty well for the next six or eight weeks. The new building of The East Ohio Gas Co., of which the general contract has been awarded to James L. Stuart, will require 1,500 tons of steel.

More Active at Chicago

Chicago, Sept. 1.—Structural lettings in the west the past week total more than 6,600 tons and several items are of unusual size. Structural prices are unchanged and shapes are steady at 1.38c, Chicago.

CONTRACTS AWARDED.

Mannheimer Realty Co., St. Paul, Minn., store building, St. Paul, Minn., 3,710 tons, to Herzog Iron Works.

City of Chicago, Belmont avenue bridge, 1,019 tons, to American Bridge Co.

Willys-Overland Co., Chicago, structural steel for building at Armour avenue and Twenty-fourth street, Chicago, 876 tons, to Hansell-Elcock.

Colorado Building & Investment Co., Denver, Colo., Colorado National Bank building, Denver, Colo., 717 tons, to Omaha Structural Steel Co.

City of Chicago, Montrose avenue bridge, 238 tons, to Modern Steel Structural Co.

Illinois State Bank building, Quincy, Ill., 229 tons, to Vanterhort Construction Co.

Colorado Fuel & Iron Co. Denver, Colo., 218 tons, to M. J. Patterson. (Contract for work erected.)

Masonic temple, Grand Rapids, Mich., 1,100 tons, awarded to Toledo Bridge & Crane Co.

American Bridge & Steel Co., Buffalo office, contract secured through Lathrop, Shea & Henwood, Buffalo, for bridges; one at Albany, taking 433 tons; one at Amsterdam, taking 834 tons structural.

Lupher & Remick, Buffalo, general contract, highway bridge at Rotterdam, N. Y., taking

(*For complete prices see page* 454.)

200 tons structural. Sub-contract on steel to Massillon Bridge & Steel Co., Massillon, O.

CONTRACTS PENDING.

The East Ohio Gas Co. office building, 1,500 tons. James L. Stuart, general contractor.

Coaling plant at Cristobal, Panama Canal, 4,500 tons; bids to be taken by government Sept. 21.

Miscellaneous bridge work for Pennsylvania railroad, about 1,500 tons, including 500 tons at South avenue and Hay street, Wilkinsburg, Pa., 300 tons for overhead bridge at Woodvale, Pa., and other work; bids taken.

Bridge at Hilton, N. C., for Atlantic Coast Line, 700 tons; bids taken.

Union bank building, Scranton, Pa., 550 tons; general contract awarded to C. T. Wills, New York City but steel still pending.

Bridge across Allegheny River at Kiskimenitas Junction, Pa., for Pennsylvania railroad, 3,000 to 4,000 tons; bids taken Aug. 29.

Addition to Hotel Randolph, Atlantic City, tonnage not given; plans issued for bids.

Buffalo Structural Steel Co., Buffalo, low bidder on steel, new school 54, city of Buffalo, 240 tons.

Eight Millions

Represent Value of Order for Autos to be Placed for Export

New York, Sept. 2. (By wire.)—Steel makers are much interested in an order which practically has been closed with American builders for 2,000 motor ambulances and trucks for shipment to one of the European nations now at war. The value of the order is set at $8,000,000.

Railroads are putting out fair bridge inquiry. The Bangor & Aroostook is taking bids on a bridge at Van Buren, Me., requiring 1,500 tons of steel. The Pennsylvania railroad has issued miscellaneous new inquiries totaling about 1,500 tons, and the Atlantic Coast Line is in the market for a bridge at Hillton, N. C., involving 700 tons of steel.

Sales Averages Unchanged

Pittsburgh, Sept. 2. (By wire.)—W. P. Snyder & Co. announce that the average prices of Bessemer and basic for August were $14 and $13 respectively, the same for both for the past five months. The tonnages involved were light.

Greene Brothers & Co., brokers in iron and steel scrap, have established offices at 740 First National Bank building, Chicago. This concern was organized recently with the following officers: President and general manager, S. C. Cyzio; vice president, W. B. Gawrych; secretary-treasurer, C. T. Maitzen.

Cheering News

Congress Preparing to Adjourn—About to Pass Clayton Bill

Washington, Sept. 2. (By wire.)—The vote on the Clayton bill in the Senate this afternoon seems assured. With it and the federal trade commission bill reported from conference, the anti-trust program for this session will be completed.

The decision was reached yesterday to drop the Rayburn securities bill for this session. The caucus on legislative program, called for today, has been postponed.

Majority Leader Underwood, of the House, announced that Congress probably will adjourn within a month.

The only important amendment to the Clayton bill adopted yesterday was that offered by Senator Reed. It provides that a corporation, when adjudged a monopoly, shall have assets sold by court to persons who will restore competition. The Senate rejected amendments limiting the size of corporations and also amendment preventing interlocking directorates between railroad and mining companies.

Senator Cummins this afternoon assailed the provision relating to interlocking directorates as being weak and said it would be better to have no such provision at all than the one which has been incorporated in the bill. Administration Senators have from time to time been charged with emasculating the measure and fitting it to suit "big business". It was the view of Senator Clapp that when "trust barons viewed the process they would think the measure had been treated in a Sunday School conference instead of a legislative body."

He made this statement following the adoption of amendments striking out provisions for jail sentences for violators or prohibition against holding companies and purchase of supplies by railroads from corporations with common directors or officers.

It was explained by members of the judiciary committee that the prohibitions of these sections were indefinite and that it was best to allow the trade commission to enforce its provisions by injunctions. It was also contended that under another section personal guilt was fastened upon officers of a corporation violating the law.

The Senate adopted the Walsh amendments providing a fine of $5,000 or imprisonment not exceeding one year, or by both, for entering into "tying contracts". The Senate rejected, by a vote of 26 to 23, an amendment offered by Senator Borah granting employers the right to claim a jury trial in contempt cases arising from alleged violations of the anti-trust laws. This right is given in the Clayton bill to employes in cases resulting from the same statutes.

The Senate also rejected an amendment by Senator Reed to prohibit entirely one interstate corporation owning stock in another interstate corporation engaged in the same line of business, the vote being 27 to 22. Likewise, the Senate rejected a similar amendment by Senator Cummins, who proposed to except banks and railroads.

(*For complete prices see page* 454.)

Pig Purchase

Dependent Upon Obtaining Tube Section Contract

Pittsburgh, Sept. 2. (By wire.)—The probability of additional contracts being placed for East river tubes at New York has brought out tentative inquiries for from 10,000 to 25,000 tons of foundry grades for cast iron sections. It may be a fortnight, however, before any definite action is taken in this work. It will be recalled that the Wheeling Mold & Foundry Co., Wheeling, and the New York Car Wheel Co., Buffalo, were each awarded contracts about June 20 for from 35,000 to 40,000 tons of cast iron sections and corresponding pig iron tonnages were obtained at that time.

Enters Sprinkler Field

The Merchant & Evans Co., Philadelphia, recently has issued a catalog and circular describing its automatic sprinkler system for fire protection. Although this company did not enter the sprinkler field until the end of February, 1914, a large number of installations have been made throughout the country. In addition to automatic sprinkling apparatus, the Merchant & Evans Co., manufactures gravity closing dampers, which may be fitted with fusible links for protection in case of fire. The company also deals in tin and terne plates, sheet steel, galvanized iron, special roofing material, brass and copper in all forms, phosphor bronze bushings, grease cups, etc.

O. H. Hill Co., manufacturer of elevator and fire doors, has recently occupied its new building at 2253 St. Paul avenue, Chicago.

Ship Bill

Urged by Secretary McAdoo—Will Soon be Reported

Washington, Sept. 1.—Work of completing the final draft of the bill designed to provide means for the transportation of American manufactures and crops for export will be taken up tomorrow morning by the House committee on Merchant Marine and Fisheries. This announcement was made this afternoon by Representative Alexander, chairman of the committee, following the appearance before the committee of Secretary of Treasury McAdoo. Representative Hobson also appeared before the committee. Business before the House prevented the appearance of Majority Leader Underwood.

The measure, supported by the administration, promises to be introduced and passed in the House virtually in the form in which it is now, although certain modifications are being proposed. Quick enactment of the bill into law for the establishing of new trade routes for business interests of this country, as well as caring for other trade, now paralyzed because of the European war, was urged by Mr. McAdoo.

Indications are that the bill will be accepted by the naval affairs committee of the House as satisfactory and that the latter will not at this time at least push the Weeks bill, or one carrying similar provisions. This measure, which has passed the Senate, would provide for a line of naval cruisers and scout ships for the South American trade.

Mr. McAdoo, in urging immediate passage of the Alexander bill, emphasized the great opportunity now confronting this country for the building up of a great trade with South America and Spain. He said, however, that not only would new trade routes be established, but that the ships would operate wherever the commerce of the country demanded. The shipping board, consisting of the President and cabinet members, provided in the bill, would see that the laws of neutrality were strictly observed. Mr. McAdoo saying there need be no fear of this country getting into trouble through the operation of the ships. They would be conducted by a corporation with a capital of $10,000,000, and at least 51 per cent of the stock would be owned by the government.

In reply to a question by Chairman Alexander, it was stated by McAdoo that he had no objection to broadening the bill so that the proposed ships could be, if necessary, built by private concerns of this country. He impressed upon the committee the necessity of obtaining the ships at once, however. It was assured that no "junk" ships would be bought or excessive prices paid. He told Chairman Alexander that he would have no objection to a provision that these ships from time to time be leased to other corporations upon terms and conditions as the shipping board might determine.

Activities in Washington

President Wilson and administration leaders are trying to assure a quorum in both houses of Congress to prepare for emergencies arising from the European war.

A conference of Democrats is scheduled for this week to consider legislative program, the nature of a revenue measure to offset losses due to the war being the principal matter for discussion. Tax may be confined to beer, domestic wines and patent medicines.

President Wilson may address Congress this week with regard to a plan to ban all exports from Philippine Islands except to the United States as measure to prevent international complications.

Rayburn securities bill, part of anti-trust program, has been dropped for this session, and will be taken up next winter.

Clayton anti-trust bill is expected to pass the Senate this week and conference reports on it and Federal Trade Commission bill probably will be expedited.

Administration plans for relieving present emergencies due to war, for inaugurating permanent American merchant marine and for ship purchase proposal being pushed.

House naval affairs committee will discuss with the President the proposal to substitute an increased naval auxiliary program for the projected private shipping company under government control.

Amendment to war risk insurance bill made by House, agreed to by Senate. Measure probably will be signed by President before end of week.

Prof. W. Trinks, professor of mechanical engineering in the Carnegie Institute of Technology, and consulting engineer for the Mesta Machine Co., Pittsburgh, has returned from Europe. Prof. Trinks had inspected numerous steel plants in Germany before hostilities broke out.

Can Company

Hearing in Progress at Chicago in Dissolution Suit

Chicago, Sept. 1.—Hearings are on in this city this week in the case of the government against the American Can Co. on the charge of violating the Sherman law. It is expected about 40 witnesses will be heard here and the examiner then will go to Seattle, San Francisco, Los Angeles, St. Louis and Pittsburgh.

Oliver W. Norton, the blind pioneer in the can-making industry, was the first witness. With Daniel G. Trench and William Moore, of Hoopeston, Ill., Mr. Norton was sworn Monday afternoon. With his brother, Edward Norton, he formed the concern known as Norton Bros., makers of can-making machinery, operating the largest factories in the country, the principal plant being at Maywood. Edwin Norton became first president of the American Can Co. in 1901. Mr. Norton gave testimony as to the situation of his concern and the formation of the American Can Co.

Daniel G. Trench, now vice president of the Sprague Canning Machine Co., testified that he was an officer of the Union Can Co., of Hoopeston, Ill., and the United States Can Co., of Buffalo, just before they were taken into the American Can Co. He said the Hoopeston concern was earning 10 per cent on a business of $1,200,000 the last year they operated. In 1898 and 1899 the company lost money as the Norton Bros. opened a competitive war and forced selling at less than cost. He admitted the price paid for the plant and patents of the Union Canning Co. at Hoopeston was exorbitant.

"Prices of cans are the same everywhere," he said.

James L. Board, formerly of Chicago, who testified that his home now is "anywhere my hat hangs", told of selling to the American Can Co. for $1,100,000, of which he received $850,000 in stock, and a promise he interpreted to mean he would be assisted to make money on the stock market.

He testified three years elapsed between the first visit of Edwin Norton with a proposition for a sale and the final transfer. He gave an option at $650,000 for six months, but it was not closed. Three years later, after the business had been practically doubled, a second option at $1,100,000 was given and was closed in 1901.

A deduction of $250,000 from the option price was made, but Mr. Board never was able to discover why this was done. Mr. Board has lost his fortune and is promoting real estate

William Leitsch, a packer of corn

and peas at Columbus, Wis., whose output is practically 5,000,000 cans a year, testified he could buy cans from only the American Can Co. and the Continental Can Co. He said their prices seldom varied more than 25 cents per thousand.

C. B. McDonald, head of the McDonald Machine Co., Chicago, said the can business had increased largely since 1901. His concern was the only large one left out of the combination. He said prices have been higher and conditions much better in this line since formation of the American Can Co.

"Since the American Can Co. was formed," he said, "the machinery market has improved greatly. I believe the industry has doubled in the past five years. I think this condition is normal and not brought about by any combination of circumstances."

Prize Awards

Made to Mining Companies for Promoting Safety

Marquette, Mich., Sept. 1. (By wire.)—Deep interest is being taken in the safety first movement by all the mining companies operating on the six iron ore ranges of Michigan and Minnesota. This was demonstrated yesterday at the opening of the nineteenth annual meeting of the Lake Superior Mining Institute. Seventy-two iron ore miners gave an instructive exhibition of rapid and efficient methods of giving first aid to the injured. This exhibition opened the day's program, attracting and holding the attention of the 400 members attending. The Marquette range team of the Republic Iron & Steel Co. won first prize, the Negaunee team of the Cleveland-Cliffs Iron Co., second, while the Marquette team of the Oliver Iron Mining Co., the Maas team of the Cleveland-Cliffs Iron Co. and the Newport Mining Co. team tied for third.

Visits to the new Athens mine of the Cleveland-Cliffs Iron Co. at Negaunee and the big concrete dock of the Lake Superior & Ishpeming railroad at Presque Isle were followed by a banquet served in the evening at the plant of the Lake Shore Engine Works at Marquette.

Institute members left for Detroit Tuesday morning; Wednesday and Thursday will be spent in visiting plants in that city.

After a two weeks' idleness, the band mill of the Sharon Steel Hoop Co., Sharon, Pa., will resume operations the last week in August. The mill was closed to make necessary repairs to a heating furnace.

Foreign Orders

Booked by the United States Steel Corporation

New York, Sept. 2. (By wire.)—With the shipping situation clearing up in a manner very satisfactory to vessel owners and shippers, the heavy export demand for American steel products is beginning to be transformed into actual orders. The Steel Corporation has booked a number of good sized orders for shipment abroad, some of them at very favorable prices, and its boats are beginning to move. It is completing details for putting 10 of its boats owned outright under the American flag. Some of the business taken is for South America, where the Corporation has been running three lines, one to Brazil, one to the River Platte and another to the west coast. It also has made some important sales of skelp, rods and other semi-finished and finished to Great Britain and other European countries. One sale of 1,000 tons of wire nails to England was closed at higher than domestic price. Negotiations are now under way to transfer to this country a large tonnage of rails for South America which Germany is unable to ship.

The Corporation has taken an order for 12,000 plates for an Australian water line upon which it competed and lost to Germany several months ago. It now regains the business at a price $7 per ton higher than was originally quoted.

Inquiries are heavy from South America, Australia and Africa. Leading ship owners who will transfer under the American flag are expressing complete satisfaction with remedial legislation now being enacted.

The President's proclamation on conditions of navigation, to be announced today, will, it is understood, be very liberal.

Coal Needed

By South American Consumers—Traffic Retarded

New York, Aug. 29.—South American consumers continue to put out some heavy inquiries for American steam coal. The Government Railways of Chile now are in the market for 900,000 tons for delivery in equal annual installments over the next three years. Bids upon this contract are to be taken at Valparaiso, on Oct. 24. The Minister of Marine of the Argentine Republic is inquiring for 200,000 tons of coal for the requirements of his department.

Blast Furnace Notes

Reports that the Canal Dover stack of M. A. Hanna & Co., Cleveland, at Canal Dover, O., is ready to resume operations are denied.

Cherry Valley furnace of the United Iron & Steel Co., Cleveland, at Leetonia, O., will be blown in this week on foundry iron, after an idleness of several months.

No. 3 blast furnace of the Cambria Steel Co., Johnstown, Pa., was put in blast Aug. 22, after being rebuilt and relined. The company is operating six of its eight blast furnaces.

Midland furnace of the Pittsburgh Crucible Steel Co., Pittsburgh, at Midland, Pa., is being prepared for the torch after several months' idleness. The furnace has been relined and enlarged. She will run on basic iron.

Punxy furnace of the Punxsutawney Iron Co., Punxsutawney, Pa., will resume operations on foundry iron at an early date. The stack, which went out of blast several months ago, has been improved in several respects.

Clinton furnace, of the Clinton Iron & Steel Co., South Side, Pittsburgh, probably will go out of blast this week. The stack has been operating on foundry iron since operations were resumed last December. The present furnace replaced one destroyed in April, 1913.

The Twinlake furnace of W. R. Carr & Co., Phelps, Wis., will be blown in early in September. The furnace will run on charcoal iron and is designed to produce about six tons a day. The output will be sold by Eaton, Rhodes & Co., Cincinnati.

The Shenango Furnace Co., Pittsburgh, has blown out No. 3 furnace at its plant at Sharpsville, Pa., for necessary relining and repairs. No. 1 stack of the Shenango company, practically a duplicate of "D" furnace of the Youngstown Sheet & Tube Co., Youngstown, was blown in Aug. 17.

Among the furnaces soon to be blown out is one stack of the Eastern Steel Co., Pottstown, Pa., the stack at Port Colborne, Can., and one Buffalo Union furnace. Three stacks in the iron district are about to be blown in, the Belfont Iron Works Co., Ironton; the Kelly Iron & Nail Co., Ironton; and the Norton Iron Works, Ashland.

Reduction of Titaniferous Ores

Results of the Experiment Made at Port Henry to Utilize the Vast Deposits of Magnetic Iron Ores Which Are High in Titanium

NEAR the center of the Adirondack region of New York state is one of the most important deposits of titaniferous magnetic iron ores existing in America. For more than a century various efforts have been made to develop this property and to utilize its ore for iron making. The latest and most pretentious of these attempts was begun in February and ended in July of this year. It is currently reported that the cost was $300,000. It is probable that large quantities of gabbro ores of a generally similar character are to be found in the Lake Superior region.

While many magnetite iron ores contain titanium, and it is a frequent constituent of coke ash, the Tahawus deposit of the Adirondacks is so great —possibly several hundred million tons—its mining so simple, as it has little or no cover and is suited especially to quarrying, and its proportion of titanium oxide is so high, ranging from 15 to 20 per cent in the ore, that this experiment was expected to have a most important bearing on the future of the industry.

Lake Sanford, upon the shores of which the Tahawus deposits lie, is in the center of the Adirondacks, in a wilderness nearly 50 miles by wagon road from Lake Champlain and the town of Port Henry, where the 200-ton blast furnace of the Northern Iron Co., in which the experiment was conducted, is located.

A magnetic concentrator was built, for the purpose of extracting a portion of the ilmenite from the magnetite and thus reducing the titanium, which is contained in the ilmenite. The first plan was to separate at the mine and convey by wagon the separated ore to Port Henry. Later, however, roads were built through the forest on which grasshopper traction engines carried the ore to the Witherbee, Sherman & Co. separators, at Mineville, for treatment. It was brought back to Port Henry for smelting.

For many years the belief has been current that titanium oxide in the blast furnace made the slag relatively infusible, viscous and thick, that this ore would cause the formation of infusible titanium compounds, such as cyano-nitrite of titanium and that serious furnace scaffolding would result. Excessive fuel consumption was feared, and few furnace men were willing to use these ores.

This experiment began with a mixture of Tahawus and Mineville ores, magnetic concentrates from Witherbee, Sherman & Co. At first the percentage of Tahawus was slight, but it was increased until at the close the furnace was worked on 31 per cent Tahawus and 69 per cent Mineville. At no time during the entire run did the furnace scaffold seriously and never was the slag anything but fluid and acidic.

The average of Tahawus concentrates used during the test was:

	High.	Low.	Average.
Fe	57.05	44.85	54.27
TiO_2	14.90	10.81	13.57
Va_2O_3	0.404	0.395	0.401

In addition to these ores those used were Barton Hill, Harmony, New Bed and Old Bed. Barton Hill carried 0.914 per cent titanium oxide, and New Bed 0.69 per cent. Neither was used in large amounts.

It will be seen readily that any experiment in which the total titanium in the iron charge is that derived from what may be contained in 31 per cent of the burden running 13.57 per cent titanium oxide or about 4 per cent in the charge as a whole is not especially conclusive as to what may be done with titaniferous ores, because such ores have been successfully reduced many times. It did prove that ores running up to 10 to 14 per cent titanium oxide can be mixed in the charge at least to the extent given, without danger to the furnace or excessive cost in operation.

Iron made from the ores used was not especially high in titanium. In pig iron analyses, the highest titanium was 0.67 per cent, and it was found that the higher the silicon the higher the titanium, the heat of the furnace having a direct bearing on the slagging of titanium acid. A great deal of low-silicon iron was made.

Titaniferous iron ore is usually low phosphorus, and composite analyses of many holes are about as follows:

Fe	SiO_2	P	Al_2O_3	TiO_2	V_2O_5 C_2O_3
50.80	3.40	0.004	4.20	20.70	0.598
35.30	18.02	0.079	5.40	15.33	0.371
42.49	10.30	0.005	4.60	17.63	0.643
51.96	1.55	0.002	3.80	20.33	0.906

A general ratio of relationship is seen to exist between these analyses. Were it possible to utilize such ore in quantity, it would add materially to the Bessemer reserves of the country.

It is evident enough that this ore makes fine iron. In 1834 the pioneers of the region erected Catalan forges and small blast furnaces on Lake Sanford and smelted this ore direct in cold blast, with charcoal fuel, a poor local flux and no other ore for a mixture. They had tremendous difficulties, but they made excellent iron. They did not know the ore carried any deleterious elements, and so could not account for their failures.

Notwithstanding extensive discussions, the work of Rossi and others, operations in England and Canada, and this recent experiment, the possibilities of smelting titaniferous ores in the blast furnace are still undetermined. That such ores have been smelted at many places and times, and that excellent pig iron has been made from them is well known. It is also known that in many such cases the consumption of fuel has been excessive. In the early days conditions existed which do not hold today. Iron was made in Catalan forges or in blast furnaces of from 2 to 5 tons daily capacity; these were in wooded regions where the cost of charcoal was not an element of supreme importance; labor was inexpensive and pig iron brought $50 to $70 a ton.

Many of those who have followed this experiment at Port Henry have remarked on this fluidity of the titaniferous slag, as unexpected and remarkable. While that may be true in this case "fluidity" may be confounded with "fusibility". The slags may be fluid by reason of the ability of the various components to enter into solution, one with another; may not they be still difficultly fusible because of the presence of elements or compounds that require excessive heat or an undue proportion of fluxing material?

But, as indicated above, when separation was actually undertaken, the tails ran wastefully high in iron and the heads undesirably high in titanium. The following are results of United States Bureau of Mines separation tests on Tahawus ores:

Average ore.		Concentrates.		Tails.	
Fe	TiO_2	Fe	TiO_2	Fe	TiO_2
.....	.....	62.66	4.00	38.86	47.50
.....	.....	60.43	8.93	45.78	45.23
.....	.....	60.60	9.66	42.84	32.22
60.58	14.00	63.00	5.25	.....	.....
.....	.....	65.02	5.90	.....	.....
.....	.....	61.04	11.00	.....	.....
55.07	19.02	61.23	11.15	32.99	47.20

Presented by Dwight E. Woodbridge, mining engineer, Duluth, at Ishpeming, Mich., meeting of Lake Superior Mining Institute, Aug. 31, Sept. 1, 2 and 3.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

A. G. Pierce, Pittsburgh representative of the Cutler-Hammer Mfg. Co., Milwaukee, has returned from a vacation in the east.

Chas. S. Bygate, general sales manager of the Whitney Kemmerer Co., Pittsburgh, is spending his vacation at Macatawa Beach, Mich.

Graham Dedge, assistant sales manager of the Edgar Steel Seal & Mfg. Co., Chicago, has been appointed assistant general manager.

Martin McKee, Cincinnati manager of sales of the Republic Iron & Steel Co., is spending a short vacation with his family at Saugatuck, Mich.

C. M. Power, general sales manager of the Standard Chain Co., Pittsburgh, is on an extended automobile tour through northern New York state.

W. G. Ireland, sales manager of the Jamieson Coal & Coke Co., Pittsburgh, has returned after an absence of several weeks on a vacation trip.

R. W. Bennett, general sales manager, is in charge of a recently opened office of the American Flexible Bolt Co., Pittsburgh, at 50 Church street, New York.

C. F. Rand, president of the Spanish-American Iron Co., sailed for Cuba on Saturday, Aug. 29, on business connected with the ore interests of his company.

John Britt, formerly chief of mine clerks for the Pittsburgh Coal Co., Pittsburgh, has been appointed auditor of the Berwind-White Coal Co. at Windber, Pa.

Lloyd B. Smith, of the Associated Geological Engineers, Pittsburgh, has sailed for Columbia, South America, where he will spend a couple of months in the oil fields.

W. H. Latshaw, 909 People's Bank building, Pittsburgh, is in charge of an office recently opened by the Richardson-Phoenix Co., lubricating engineers and manufacturers.

E. J. Best, formerly vice president of the Cleveland Machine & Mfg. Co., Cleveland, has accepted the position of chief engineer of the Algoma Steel Co., Sault Ste. Marie, Ont.

B. G. Follansbee, president of Follansbee Bros., Follansbee, W. Va., accompanied by his wife, has returned from Europe. Mr. and Mrs. Follansbee were in Germany at the outbreak of the European war.

Samuel Mather, senior member of the firm of Pickands, Mather & Co.; William G. Mather, president the Cleveland-Cliffs Iron Co., and E. W. Oglebay, senior member of the firm of Oglebay, Norton & Co., all of Cleveland, have returned from Europe.

Henry D. Shute has been elected treasurer of the Westinghouse Electric & Mfg. Co., to succeed T. W. Siemon, who recently resigned to accept the position of secretary-treasurer of the Union Switch & Signal Co., Swissvale, Pa. Truman P. Gaylord, district manager of the Electric

HENRY D. SHUTE,
Newly elected treasurer of the Westinghouse Electric & Mfg. Co.

company, at Chicago, was elected acting vice president to succeed Mr. Shute. Mr. Shute was born at Somerville, Mass. He graduated from Massachusetts Institute of Technology in 1892. In 1893 he entered the works of the Westinghouse Electric Co., at Pittsburgh as an apprentice and spent his first two years in the testing department, following which he was engaged for a considerable time in erection and laboratory work. He entered the engineering department in 1897, and one year later was transferred to the commercial department. In 1901 he was appointed head of the alternating current division thereof. Two years later, he was promoted to the position of assistant to Vice President L. A. Osborne. In 1910, Mr. Shute succeeded Walter McFarland as acting vice president of the company, which position he held until his election as treasurer of the company.

R. P. Zint, Chicago, sales manager at Chicago for the Republic Iron & Steel Co., was called to Carey, O., last week by the death of his father.

Allen V. Moyer, formerly associated with the Heine Safety Boiler Co., Phoenixville, Pa., is now with the George T. Ladd Co., Farmer's Bank building, Pittsburgh, in the capacity of mechanical engineer.

P. R. Conlin, superintendent of the Dover furnace of M. A. Hanna & Co., Cleveland, at Canal Dover, O., has been appointed general superintendent of the United Iron & Steel Co., Cleveland, to succeed B. J. Mullen, resigned. Mr. Conlin will have charge of the Cherry Valley furnace at Leetonia, O., and the Fannie furnace at West Middlesex, Pa.

T. H. Carruthers, general manager of the Cincinnati warehouse of the Bourne-Fuller Co., of Cleveland, who has been suffering from a nervous breakdown for several months, is fast regaining his health and is at present spending part of each day at his office. Mr. Carruthers expects to assume complete charge of his duties within the near future.

H. A. Butz, who for the past four years has been chief engineer of the Dominion Iron & Steel Co., Ltd., Sydney, N. S., has severed his connections owing to the fact that the company will discontinue for an indefinite period all construction work, due to the present war conditions. He has made no definite plans for the future. Mr. Butz was formerly with the Garrett-Cromwell Engineering Co., Cleveland.

A. T. Chisholm, vice president of the William Chisholm Sons Co., Cleveland, shovel manufacturer, has received a cable message from Henry A. Chisholm, president of the company, stating that he and his wife are safe in Scheveningen, Holland. Relatives had been worried over the Chisholms' safety, as they had not been heard from since the European war began. They sailed for Europe June 9 and were booked to return Oct. 19.

Boiler Makers

Discuss the Standardization of Specifications

New York, Sept. 2.—The 26th annual convention of the American Boiler Manufacturers' Association is being held at the Waldorf-Astoria. The standardization of steam boiler specifications will receive careful attention and an effort will be made toward harmonizing the regulations of the different states. To this end, a committee will be appointed to confer with a similar committee of the American Society of Mechanical Engineers, which will meet in New York, Sept. 15.

At the opening session of the convention Tuesday morning, an address of Breure, city chamberlain, and W. H. S. Bateman responded. President Meier is detained at home by illness. Reports of committees were taken up at the Tuesday afternoon session, and also at the session this morning. A banquet will be held Thursday evening.

Will Sell Ferro

U. S. Steel Corporation Again Appears in Tin Market

New York, Sept. 2. (By wire.)—The Steel Corporation again has entered the market as a seller of ferro-manganese and already has booked some tonnage from independent consumers.

Orders are being taken around $85, Pittsburgh, but there has been some range depending upon tonnage and delivery. The Corporation is understood to be in a strong position on manganese ore and, as reported, is bringing in increased tonnage of Brazilian ore, some of it in its own boats. It purchased three additional cargoes of this ore the past few days.

The report that Cuban manganese ore will be used at Ensley is inaccurate.

Mills Are Closed

Trenton, N. J., Sept. 1.—The depression in trade has caused serious results in the closing down of the principal mills of the John E. Roebling's Sons Co. Ferdinand W. Roebling Sr., secretary and treasurer of the concern, stated to a representative of THE IRON TRADE REVIEW that reports from the company's agencies in the various parts of the country were discouraging, and that the outlook for full-handed operation in the near future did not inspire even hope.

The closing down of the mills means hardships to 4,000 employes, who have been thrown out of employment. Figured in dollars, the loss for a week only in money distributed in this city amounts to at least $70,000, the greater part of the loss falling upon storekeepers and property owners for rent.

Good Record

Made by Steel Corporation During the Past Month

New York, Sept. 2. (By wire.)—Despite interruption of new domestic business noted by some makers, the Steel Corporation made a better record in August than in July. Both bookings and shipments increased then and unfilled tonnage for past month will show gain, probably about as much as in July. The Corporation is now operating about 65 per cent of ingot and 67 per cent of blast furnace capacity.

Tin plate demand is very heavy here, in considerable measure due to the large business of canners. One leading can maker is producing this year 40,000,000 cans more than previous best record.

METAL MARKETS

New York

Sept. 1.

The refined copper market today is unchanged and quiet.

Current antimony business is going at these prices: Cookson's, 15c to 16c; Hallett's, 14c to 15c; United States, 13c to 14c; Hungarian, 12c to 12.50c. The situation is quiet.

Tin is lower, being offered ex Minnehaha at 38c. Cablegrams from London say it is hard to get tin in the east and after the arrival of present metal afloat another scarcity can be expected here. Higher prices, consequently, are looked for later.

Spelter is the most confused of the metals and it is impossible to quote accurately. All kinds of prices are heard. One selling agent quotes 5.75c to 5.87½c, New York, or 5.60c to 5.72½c, St. Louis. A producer quotes 5.87½c to 6c, St. Louis, and 6c to 6.10c, New York. Another says 6.10c, St. Louis, and 6.25c, New York. The market is comparatively inactive. Lead is 3.75c, St. Louis, and 3.90c, New York, and quiet.

Old metal consumers are offering good prices, but the supply, with the exception of lead, is small. Cocks and faucets are quoted at 8c to 8.50c; heavy brass, 7.50c to 7.75c; block tin, 35c to 36c. Other old metal prices are unchanged.

Mr. Frick's Illness

Henry C. Frick is ill at his country home near Beverly, Mass., but not dangerously so, as stated by newspaper reports during the past few days. Mr. Frick is suffering from an attack of muscular rheumatism, but his condition, according to the direct advices received from his physicians and members of his family, is not serious.

Obituaries

Rudolph J. Logemann, secretary and treasurer of Logemann Brothers Co., Milwaukee, aged 46, dropped dead Aug. 27 while using the telephone in his office. Heart disease was the cause. He was born in Milwaukee and graduated from the engineering department of the University of Wisconsin.

James H. Van Dorn, president of the Van Dorn Iron Works Co. and the Van Dorn & Dutton Co., Cleveland, died unexpectedly of heart failure at his home, Cleveland, Aug. 29, aged 73 years. He was born at York, Medina county, O., Dec. 4, 1841. At the age of 18 he was apprenticed to a blacksmith at Elyria, O., and at the age of 30 was employed as an iron worker at Akron, O. In 1873 he removed to Cleveland and founded the Van Dorn Iron Works Co. Of his two sons, James P. Van Dorn is vice president of the Van Dorn Iron Works Co., and Thomas B. Van Dorn is manager.

James M. Frink, for 32 years president of the Washington Iron Works Co., Seattle, died at his home Aug. 31 of heart failure. Mr Frink was prominently identified with the iron and steel industry on the Pacific coast. He has been affiliated with the United Metal Trades Association of the Pacific coast in various official capacities for many years, and it was through his efforts that the Washington Iron Works Co. grew from small beginnings to one of the largest manufacturers of logging equipment in the northwest. Mr. Frink is survived by his two sons, Gerald Frink and Francis G. Frink, who will continue actively in charge of the business of the Washington Iron Works Co.

John Armstrong Rollins, member of the firm of Naylor & Co., 45 Wall street, New York City, iron and steel merchants, and vice president and director of the American Grondal Co., died at the Nassau Hospital, Minneola, Long Island, on Aug. 27, from injuries sustained in playing polo on the Meadow Brook, Long Island, grounds on Aug. 22. While engaged in playing, Mr. Rollins accidentally tripped his pony with his mallet and was hurled to the ground, his mount rolling over him. He sustained a fracture of two ribs and concussion of the brain and was taken at once to the hospital. Mr. Rollins was a native of London, having been born there in 1871. He was a prominent clubman about New York City and was a devotee of the sport of poloing, having taken a leading part in promoting the international matches.

Fires in Lake Superior Mines

Methods of Fighting and Preventing Conflagrations in Underground Iron Mines

MANY mine fires have occurred on the Lake Superior iron ranges during the past 25 years and some of them have resulted in serious loss of life and property. Certain operators, especially those who have experienced losses, realize the danger of underground fires and have adopted preventive and protective measures. There are others, however, who have not given the matter much thought, or who do not appreciate the necessity of special precautions for protecting their mines against fire. This feeling of safety is caused by the fact that many of the mines have had no fires during periods of 20 to 30 years.

The purpose of this paper is to awaken the operator to the ever-present danger of fire underground. Most of the suggestions regarding prevention and protection are old and well known, and although some of them are at present in use, there are still a great number of mines provided with little or no protection.

Except in the discussion of fires in the combustible black slates of the Menominee range, this paper will deal only with fires originating at or near the collar of the shaft, in the shaft, or underground. All statements refer to conditions as found on the Lake Superior iron ranges, although they may be applicable to other metal-mining districts. Most shafts are lined entirely with timber. Some have steel sets with timber lagging and others are of steel and concrete construction throughout.

Of the 31 fires covering which statistics are available, 14 were probably due directly or indirectly to the use of candles and 19 started in or within a few feet of the shaft. Twenty-two lives were lost. In considering this record, one should remember that it is far from complete. During the past three years there were nine fires, involving the direct loss of eight lives and of property to the value of many thousands of dollars. Much additional loss resulted from the suspension of mining operations.

In adopting measures for the prevention of underground fires the aim should be to remove, as far as conditions will permit, the causes of fires and to provide means for quickly subduing an incipient blaze. Statistics of metal-mine fires from all over the world show that the great majority of fires originate in the shaft or pump station, in the shaft proper, or at or near the shaft collar. Hence, it appears that fire prevention is of greatest importance in these places.

Pump and shaft stations cut out of the solid rock or constructed of steel and concrete present the minimum danger, but even in such stations it is well not to neglect the ordinary precautions for fire prevention.

In stations supported by timber the following suggestions are offered: Do not allow combustible material of any kind to collect; do away with open lights as far as possible; use care in electric wiring; have separate receptacles for clean and oily waste; do not place machinery close to dry timber. In the case of the pump station, if conditions do not warrant steel and concrete construction, at least break the continuity of the timbering between the station and the shaft. If support is necessary, a few sets of steel will serve the purpose.

Causes of Mine Fires

Careless use of lights underground or at shaft collar.
Defective electric wiring.
Spontaneous combustion from friction in shaft rollers or underground machinery.
Spontaneous ignition of combustible rock.
Dropping lighted paper in ore chute.
Building small fires underground for any purpose.
Dumping ashes in open pits connected with underground workings.
Careless use of matches.
Incendiarism.
Smoking in timbered places near shaft collar or underground.
Sparks from surface engines of any kind or from surface fires.

Fire Prevention in Shafts

Obviously, the steel and concrete shaft is safest. There are a few shafts of such construction either in use or in process of being sunk. If timber is used the dry shaft is, of course, in the greatest danger, although the wet shaft is not immune from fire. There are certain fire-resisting materials, such as zinc chloride, that may be employed, if desirable, to render shaft timbers less inflammable. Dry shafts should be sprinkled with water at sufficient intervals to keep the timber at least damp. The sprinkling may be accomplished by various means. If a separate water line from the surface is provided the pipe may be tapped every 100 feet and a valve and a 50-foot length of hose supplied. If sufficient water is encountered in driving the workings, the water column may be tapped as described above. Some types or special sprinkling devices are efficient. Any system that provides for wetting the shaft timbers acts as protection as well as prevention.

A certain mine on the Gogebic range has had in use for some time a device for spraying the shaft. The water column is tapped every 50 feet. Owing to the high water pressure, a special pressure-reducing valve is attached. Connected to this valve are four jets, pointing in different directions, so that all parts of the shaft may be reached by the water. The handle of each valve is securely attached to a ⅜-inch steel cable, and this in turn is connected with a lever at the shaft collar. The lever may be operated by one man and all of the valves opened simultaneously. The shaft has a dip of 75 degrees and is about 1,100 feet deep.

Care should be used in all electric wiring; rollers, where used, should be kept well oiled; candle snuffs or any form of open light should not be left on or near the timbers; steam pipes should be covered or kept well away from timbers.

Any wooden structures at or near the shaft collar (especially shaft houses of wood) are dangerous. The safest construction is the all-steel headframe, with steel and concrete shaft collar to a depth of 25 feet or more. Headframes and shaft houses of wood are still in use at a great many mines, but in most of the new construction steel is used. In cases where conditions do not warrant tearing down the wooden structure the danger may be lessened by concreting the shaft for several sets below the collar and providing an iron door for covering the shaft in case of fire in the headframe.

Carbide lamps, candles and different types of wick-burning lamps are the types of lights used by the miners in Lake Superior iron mines. The carbide lamp is rapidly displacing the other types; on some of the ranges it is used almost exclusively. Directly or indirectly, candles have probably been the

Portions of a paper published by the Bureau of Mines, Department of the Interior, Washing, D. C.

FIG. 1—COLLAR OF NON-COMBUSTIBLE CONCRETE SHAFT NEAR VULCAN, MICH.

cause of a large proportion of mine fires. The candle burns with an upright flame, consumes more oxygen than does the carbide lamp, and is at least twice as costly per man per shift. Of the three classes of lights, candles are most likely to be left burning in the working place when the miners go off shift.

Dangers from Candles

The greatest danger is from the candle snuff, which may be left or may drop on or near combustible material. A method of lighting sublevels still practiced in some mines is to place a candle between two nails driven into the timber. The danger here is from the candle leaning against the timber, or from the dropping of the snuff on or near combustible material. In nearly every mine where this practice is followed the timber is found to be charred. In several instances the snuff has been watched as it fell from between the nails; it usually remained lighted. Solid-bottom holders are an improvement over the nail supports, but the writer believes that the best remedy is to do away entirely with candles as means of lighting in timbered mines.

Wick-burning lamps burn with a long, smoky flame and are liable to catch fire; however, they are usually taken from the mine at the end of a shift.

Carbide lamps give a stronger light and consume less oxygen than do either candles or wick-burning lamps. In regard to safety, efficiency and cost the carbide lamp appears to be a most desirable type of light for the miner. Owing to the prejudice of some miners trouble is sometimes experienced in introducing carbide, but the prejudice may be overcome by a little diplomacy. Again, there may be some trouble at the start in getting the best results from the lamps, but experience has shown that these troubles are short lived and soon become almost negligible. Although carbide lamps are a great improvement over candles, there is still room for improvement in the method of lighting metal mines. A simple, inexpensive, and efficient lamp with an inclosed flame would approach nearer the ideal. It is possible that a portable electric light will be produced that will fill this ideal. The electric lamp is now being extensively introduced in coal mines.

A fire patrol, covering all parts of the mine where timber is used, is recommended. Although a patrol is a wise precaution under almost any conditions, it is especially desirable in timbered mines that are dry. Provision for a fire patrol may be made without much additional cost by using workmen whose other duties do not consume the entire day.

As a matter of economy, as well as fire prevention, steam pipes should be covered, especially where they must be laid close to timbering or lagging. The heat of uncovered steam pipes naturally tends to dry wood and render it liable to ignite when an open light is brought close to it.

Combustible material, such as dry wood, powder boxes, candle boxes, paper, hay, waste or manure should not be allowed to collect in any part of the mine, especially at or near shaft and pump stations. A match or light of any kind dropped into a pile of such rubbish will start a fire readily.

Large quantities of lighting or lubricating oils should not be stored underground. If it is necessary to store such material, provide a safe place removed from timbered places. In heating oil for use in wick-burning lamps do not perform the operation near combustible material. In oiling machinery care should be exercised not to spill the oil on nearby timber. Cars should be oiled at a place especially provided for that purpose—not anywhere a motor or train of cars may happen to lie.

A study of the causes of mine fires, together with a consideration of conditions existing at any one mine, will enable the official to prepare a suitable set of rules and regulations for the prevention of fire. Such rules should be worded simply and should be posted in conspicuous places. Above all things, they should be rigidly enforced.

Fire-fighting Appliances

Below are suggested protective measures applicable to practically all mines. Although they may not all be necessary for any one mine, the list is suggestive and from it an effective system of fire protection may be worked out.

Provide one or more water plugs, with several lengths of hose, at or near the shaft collar.

Provide one or more chemical fire extinguishers at or near the shaft collar, at every shaft station, and in dry timbered drifts distant from the shaft.

Provide a water plug with hose at

FIG. 2—DOOR OF POWDER MAGAZINE UNDERGROUND WITH FIRE EXTINGUISHERS AT HAND

every shaft station, and supply water either through a separate line from the surface or by tapping the water column. A shaft-sprinkling device may serve the same purpose.

Make the air line convertible into a water line.

Have a water barrel and buckets at stations even when there are hydrants and hose.

Provide dry extinguishers, such as sand, salt or powdered limestone.

Provide at stations of working levels a box containing tools for carpenter and pipe work.

Arrange for the control of the ventilation through the use of doors.

It is desirable to install reversible fans to insure a positive movement of air in fighting fires.

Provide air-tight fire doors for the isolation of parts of the mine.

Install fire doors in each level, if possible; also have fire doors at the top of the shaft, if the shaft house is combustible.

Have fire drills and a prearranged plan of action in case of fire.

Provide oxygen-breathing apparatus.

Provide fire signals.

Arrange to notify men and to get them to the surface promptly in case of a fire underground.

Do not throw water down a burning upcast shaft when there are men below and the ventilation is only natural; the current is liable to be reversed and the smoke and gases thus sent into the mine.

In providing a water supply for fighting fire it is far preferable to run a separate pipe line into the mine from the surface. Tapping the water column is less expensive, but this arrangement makes the supply dependent on the pumps. A barrel filled with water, with buckets nearby, is an efficient protective measure in dry stations. This should be used especially where there is no provision for water from the water column or a separate pipe line; even when such provision is made, the barrel is useful as an auxiliary in case something goes wrong. In cases of underground fires men have been known to pass by chemical extinguishers to look for water, probably because they did not understand the extinguishers.

FIG. 4—FIGHTING FIRE IN SURFACE CAVE

Chemical extinguishers are excellent for quick work, but if they are installed it is important that sufficient men be instructed in their use. Also, the extinguishers should be kept properly charged.

Surface fire-alarm systems should include a system of signals to indicate fire at all shafts. In order that the engineer may be notified promptly of a fire, the signal code from underground should embrace a special alarm indicating that there is a fire and on what level of the mine. In this connection, the mine telephone is a useful device.

Usually it is the duty of the shift boss to notify miners in time of fire. Another method, in use at some mines, is to turn off the compressed air, this being a signal for all miners to report to the shaft. This signal could not be used, of course, on levels where the ground is broken by hand methods. Should the compressor break down and the fire signal be thus inadvertently given, miners would lose little time, for they would doubtless be sitting around waiting for the air to be supplied again.

In mines where the haulage roads are electrically lighted, a fire signal can be given by throwing the current off and on a certain number of times. However, this does not serve as a warning to men in the stopes and sublevels above the main haulage level.

Fire crews should be familiar with all fire-fighting equipment and should be drilled at stated intervals. There should be a prearranged plan of action to be followed in case of fire.

As part of the mine equipment for protection against fire underground, oxygen-breathing apparatus is invaluable. Such apparatus enables the wearer to perform hard labor in an atmosphere containing smoke, fumes, or poisonous gases. The apparatus should be kept in a place protected from hot air, steam and dust; it should be kept clean and tested at frequent intervals to make sure that it is ready for instant use. Neglect of this precaution might result in the serious injury or death of the man wearing the apparatus; furthermore, it might result in fatal delay to men caught in a gas-filled mine. A sufficient supply of oxygen should be kept on hand at all times.

There should be at least two crews of five trained men—more would be better. No less than five men should be allowed in a party going underground during a mine fire. With any smaller number an accident to one of the party may prove fatal. The leader of the crew should be cool and deliberate and should take every precaution to protect the men under him. He should know the mine and understand the breathing apparatus thoroughly.

In the Lake Superior iron mines, as in nearly all metal mines, the only gases that must be dealt with during a mine

FIG. 3—FIRE IN PYRITIFERROUS BLACK SLATE IN SURFACE CAVE

fire are carbon dioxide (CO_2) and carbon monoxide (CO). The exception to this statement in the Lake Superior region is from the burning of the combustible black slates of the Iron River-Crystal Falls district of the Menominee Range, in which sulphur dioxide (SO_2) is produced. Also, there have been reports from time to time of the presence of a small amount of an inflammable gas (not in explosive proportions) in the mine workings of this same district and in some of the mines near Iron Mountain, farther toward the south. At the Florence mine, Florence, Wis., a short distance north of Iron Mountain, a drill hole sunk from the bottom of the mine is reported to have given off a hydrocarbon gas that when ignited burned with a blue flame. Such gas is of local occurrence, and reports of fires in the mines of the vicinity do not indicate that the gas has played any part in the loss of life or property.

Effect of Carbon Dioxide

Carbon dioxide, or carbonic-acid gas is a product of complete combustion and must be dealt with in all mine fires. It is a colorless gas without odor but with a slightly acid taste. Its specific gravity is 1.529 at ordinary temperatures, but when highly heated it is expanded so that it may be lighter than cold air. It is produced by the burning of lamps, timber, or coal, by the breathing of men or animals, by the firing of explosives, and by the decay of timber or other vegetable matter.

The gas is seldom encountered in mine fires in sufficient quantity to cause poisoning, its effect being rather to replace the oxygen to such a degree that not enough oxygen is left to support life. Its first effect is to produce headache and dizziness and, in larger quantities, extreme panting. Air containing about 10 per cent of this gas will produce death in lengths of time depending upon the vitality of the subject. A candle will usually go out when the carbon-dioxide content of the surrounding air reaches about 3 per cent. The candle goes out not because of the presence of the carbon dioxide, but because of the lack of oxygen. Experiments have shown that a candle also goes out in air containing between 16 and 17 per cent oxygen.

Carbon monoxide, even in small quantities, is much more deadly than carbon dioxide. It is a product of the explosion of "powder" or of the incomplete combustion of wood or other combustible material. It is more likely to occur during a smoldering fire, such as might result in a damp or wet mine. Carbon monoxide is colorless and tasteless, and has a specific gravity of 0.969. It acts as a poison to the human system by combining with the haemoglobin of the blood and thus preventing that agent from absorbing the oxygen necessary to support life. One-tenth of 1 per cent of this gas, if breathed for a sufficient length of time, will render a human being unconscious and probably produce death. Larger proportions will produce death in relatively shorter periods of time. The gas cannot be detected by the use of a candle, an important point, for many miners believe that wherever a candle will burn they can live. Its presence can be accurately determined only by a chemical analysis of the air. However, during mine fires, mice and birds, preferably canaries, may be used with advantage in determining the presence of carbon monoxide, as these animals succumb more quickly than a human being. A man usually has no warning of the effects of carbon monoxide; he suddenly becomes weak in the knees and falls unconscious.

The lower explosive limit (ignition by flame) of carbon monoxide and air requires 16.5 per cent of carbon monoxide, although inflammation may be had with as low as 12 per cent. In the absence of other explosive gases it would rarely be possible to get an explosive mixture of carbon monoxide from a mine fire, for the reason that in an open fire the oxygen in the atmosphere would be depleted below the combustion percentage long before the explosive percentage of carbon monoxide would be obtained. It is possible, however, that if a mass of timber were on fire and a current were passing through it a condition would be created like that in a coal or wood gas producer, as pointed out by Rice. The carbon dioxide formed at the front edge fire might be broken up as it passed through the burning mass, with the resulting formation of carbon monoxide in large quantities. Fortunately this is a contingency that would rarely occur in a metal mine.

Hence it appears that in mine fires in the Lake Superior iron mines there need be little fear of encountering an explosive gas and that the use of safety lamps during mine fires is unnecessary. Nevertheless as a precaution it is desirable to have one or more safety lamps at hand for testing purposes.

Use of Animals in Mine Fires

The presence of poisonous gases may be detected readily by the use of certain small animals. Even in cases where apparatus is available for the chemical determination of the constituents of the air, conditions might be such that it would be more desirable or even necessary to use an animal. As a result of many experiments, George A. Burrell, chemist of the Bureau of Mines, has prepared the following list, showing the relative usefulness of small animals for such work: 1, canary; 2, mouse; 3, chicken; 4, small dog; 5, pigeon; 6, English sparrow; 7, guinea pig; 8, rabbit.

A canary will succumb to about one-tenth the proportion of poisonous gas required to overcome a man. Canaries and mice are most useful in exploration or rescue work during mine fires or after explosions.

Practically all Lake Superior iron mines depend on natural ventilation for supplying air underground. In many of them, however, especially those worked by the top slicing or sublevel slicing and caving system it is necessary to augment the air supply in dead ends by opening the valves of the compressed-air pipes.

How Air Circulation is Maintained

There are a few mines working with only one outlet, pending the completion of work looking toward a second outlet. In such cases air circulation is provided usually by a partition in the shaft, the compartment carrying the steam pipes being the upcast and the other compartment or compartments the downcast. A fire in such a shaft would impair the ventilation as soon as it destroyed the partition.

Most of the mines have two or four openings. As a rule the main workings are all well ventilated; it is usually under the timber mat and in dead ends that there is a lack of circulation. In many mines doors for the control of ventilation are to be found.

Control of air currents during a mine fire is of great importance. It is suggested that more attention should be paid to this subject, especially in dry, heavily timbered mines. The volume of air and the direction in which the air travels should be known. Doors should be provided at suitable points so that the circulation may be controlled. Fire doors should be so placed that it will be possible in time of fire to isolate any shaft from the near-by mine workings.

Reversal of air currents during a mine fire will cause the smoke and gases to seek escape through the opening that was previously the downcast. If men are escaping through such an opening, they may be overcome by the gases. If we assume that there is a fire in one of three shafts, all connected underground, the shaft in which the fire exists will upcast. Water played upon the fire, or into the shaft, will likely cause the current to reverse. Obviously, then, it is not safe to throw water on the fire until it is certain that all of the men are out of the mine. If, however, tight ventilation doors or fire doors are provided, they may be closed as the men leave the fire zone

and the men will then be in no danger from smoke or gas. The doors will serve the further purpose of shutting off the supply of air from the fire and thus aid in extinguishing it.

Sealing Mine Fires

The sealing of shafts or mine workings is usually resorted to when there is no other convenient means of fighting a mine fire. In such cases much care should be observed to prevent the imprisonment of men within the sealed area.

In sealing the shaft collar the common method is to use planking well covered with manure or damp earth. If the fire has reached the surface, steel or iron rails may be thrown across the collar and steel plates pushed over the rails. When thus covered, loam, clay, or fine sand can be shoveled over the top and subsequently puddled.

For bulkheads underground, 2-inch by 12-inch planks covered with paper, the cracks being stopped with rags, have been used. In one case a double barrier of this kind, the barriers 3 feet apart and the intervening space filled with earth, was used. The safest device, and one that is always ready for use, is the iron door, which may be fitted into a masonry framework. There are several efficient designs of this type of bulkhead. The door proper may be made in two sections and kept standing in the drift, ready for use. Damp clay may be kept in a tub or barrel for stopping the cracks. Fire doors of this type are in use at the Newport mine, Ironwood, Mich. Where there is no haulage cable in the way the door may be hinged at the top and held ready to drop at instant notice.

The question of how soon seals or bulkheads may be removed with safety is often one of great importance. Rapidly rising water might make it necessary or desirable to reopen the sealed area at the earliest possible moment. The only sure method of determining when it is safe to remove the seal from an inclosed fire zone is by analysis of the confined air. Normal air contains, by volume, 20.7 per cent oxygen, the remaining 79.3 per cent consisting chiefly of nitrogen. When the percentage of oxygen is reduced to 16 or 16½ per cent a timber fire will begin to burn fitfully. It is safe to assume that in timber fires in metal mines there will be no flames when the content of oxygen within the sealed area reaches 14½ to 15 per cent. However, if there is a large mass of hot material, this will retain its heat for a long time, and meantime there will be slow oxidation without flame, so that the oxygen content, if the bulkheads are tight, will continue to drop until no oxygen remains.

The Simplex Wire & Cable Co., Boston, has issued a 16-page booklet which describes briefly the manufacture and uses of an electric cable which is protected by two steel tapes wound spirally in reverse directions. It is said that steel taped cable has a field peculiarly its own. It must be used where considerations of safety and civic pride will not permit the use of overhead wire, and where a conduit system is too expensive.

Progress at Frisco

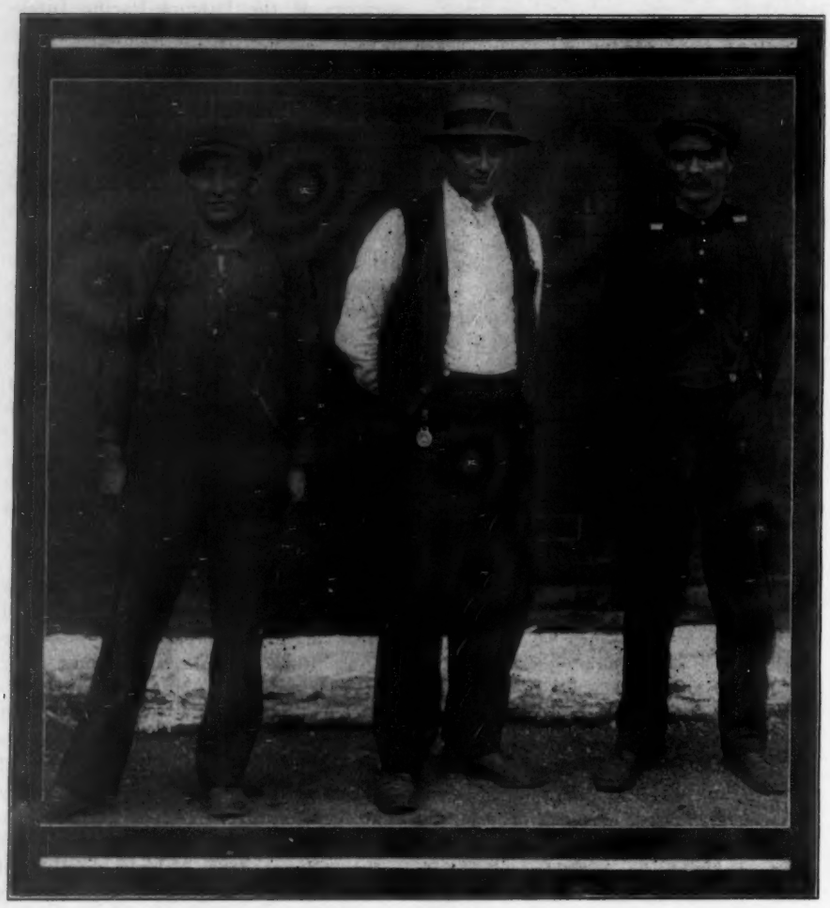
The photograph below shows two skilled workers at the Panama-Pacific International Exposition in a perilous position on the Tower of Jewels. The picture is taken at the height of 300 feet above the Court of the Universe, the great central court of the Exposition. The total height of the tower, which will be the dominating architectural feature of the Exposition, is 435 feet.

The European war will not cause the postponement of the Exposition. France has sent word that her participation will be continued; Holland has ordered the construction of the Netherlands pavilion rushed. The manufacturers of Austria are planning to resume their collective exhibit as rapidly as communications are opened. Argentine has raised its appropriation from $1,300,000 to $1,700,000. Thirty-nine nations all told will participate.

The Consolidated Expanded Metals Companies, with general offices and works at Rankin, Pa., have issued a Safety First bulletin, describing their guards for machine tools. The product is a cold drawn mesh, fabricated from basic open-hearth steel. Guards for machinery made from it admit of simple construction, easy accessibility and ventilation to the protected parts, provide easy inspection and possess other advantages. A large number of illustrations, showing machine tools in various plants fitted with these mesh guards, are given in the bulletin. The company furnishes this material in standard size sheets.

AT WORK IN MID AIR ON SAN FRANCISCO FAIR

How Committees Prevent Injury



SAFETY COMMITTEE, NATIONAL TUBE CO.
Bessemer Department, Lorain, Ohio.
From left to right:—Mike Thome, rigger; Theodore Weichel, (chairman) assistant master mechanic, and S. A. Olson, rigger foreman

SINCE the personal element is perhaps the most uncertain and the most dangerous to be taken into account in all plans for the promotion of safety for the worker, so is the personal factor utilized in the iron and steel industry to advance the efficiency of these protective systems. In the plants of the Steel Corporation last year, 7,400 individuals either directly or indirectly worked for the promotion of safety for themselves and their fellow employes. Committees are appointed in various departments to see that the rules are enforced, that perils to life and limb are guarded against or eliminated and generally to help the workman to avoid all unnecessary dangers. They usually serve for a term of two months when they are succeeded by new committees. The old members become ex-officio members of the committees. In this way, it is expected in time that every man in the works will become an active force in battling against accidents. It is well known that the most important feature of safety work is the education of the worker himself to an appreciation of the dangers that surround him. Safety appliances, goggles, leggings, guards, screens, railings, etc., are important and essential in any program for the reduction of accidents, but they can never take the place of care on the part of the men themselves. There are many plants, practically unprovided with safety

RESCUE OUTFIT AT TILDEN MINE, GOGEBIC RANGE
Part of Rescue Corps just after fighting fire in a shaft at
Bessemer, Mich.

SHOPS SAFETY COMMITTEE,
Carnegie Steel Co., Duquesne Works
Left to right:—John Parfitt, W. C. Libengood, R. D. Clark, John Kremser

Personal Element in Safety Work

appliances, that have most enviable accident records, while others with elaborate mechanical safeguards are unable to make as good a showing, simply because in the former cases the men have the spirit of safety and in the latter instances they have not.

The importance of organization, education and *esprit-de-corps* in preventing industrial accidents cannot be over-estimated. For this reason a great deal of time and effort has been spent by all of our larger and many of our smaller corporations in educating their men to be careful and in instilling the spirit of safety. Numerous methods have been adopted for stirring up enthusiasm; prizes have been offered, safety buttons and cigars have been distributed and competition for low accident records between plants and between departments in the same plant has been stimulated.

One of the most satisfactory methods of interesting the worker himself in the "safety first" propaganda, however, has been to let him share in the actual work of preventing accidents by means of safety committees. Committee work brings home to a man the importance of safety measures in a most forcible manner. Reference to the accompanying illustrations shows that the most successful safety committees are those in which all classes of workmen participate. Safety work is democratic and the laborer is fully as important as the superintendent.

BLAST FURNACE COMMITTEE, NATIONAL TUBE CO.
Lorain, Ohio.
From left to right:—Henry McGunigale, chairman; F. M. Stephenson, power house foreman and Andy Dobos, machinist's helper

PIPE MILL SAFETY COMMITTEE
National Tube Co., Lorain, Ohio
Left to right:—James L. Bowen, chairman; Laslo Gull, laborer; John H. Campbell, foreman

BLAST FURNACE SAFETY COMMITTEE
Carnegie Steel Co., Duquesne Plant
Left to right:—C. F. Clingerman, John Lenaugh, Wm. White,, Jack Shaughnessy, Bert Sickles, H. M. Stewart, S. E. Eldridge, Frank Weir, E. F. Entwisle

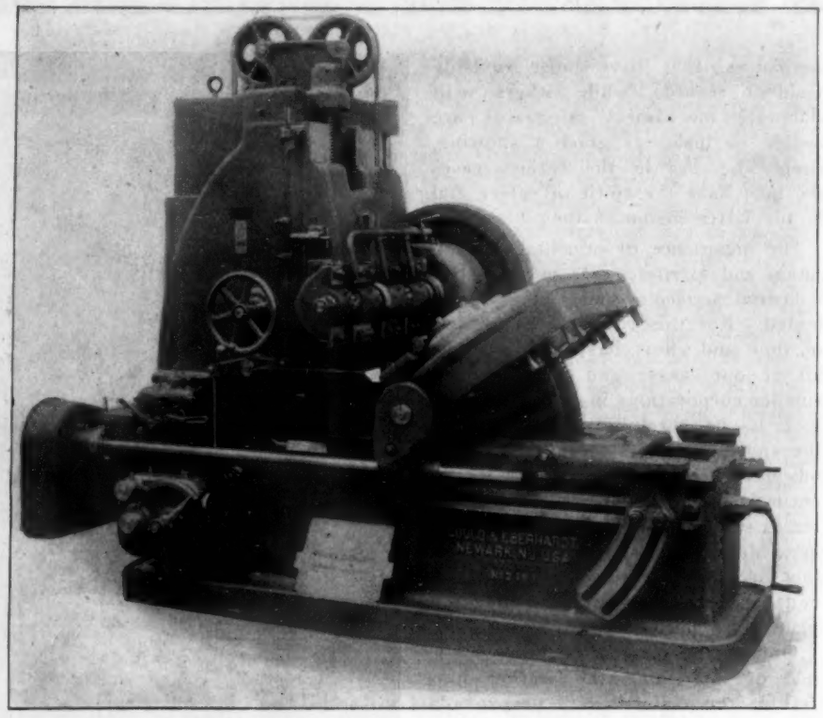
Multiple Spindle Gear Cutter

In adding to their regular line of verical cutting gear cutting machines, Gould & Eberhardt, Newark, N. J., have brought out a new size rated as a 60 x 16-inch machine, when furnished by spur gears only, and a 48 x 12-inch machine when used for spur and bevel gears. It has capacity for cutting 1½ diametrical pitch in cast iron and 2 pitch gears in steel. The machine illustrated is the 48 x 12-inch size, arranged with multiple spindle head attachment for roughing out two large bevel gears at one time. This size machine will be employed for the roughing out bevel gears used in the manufacture of automobile trucks where the work is too heavy for the smaller size multiple spindle machine now commonly used in making pleasure car gears. Machines of this new size have been sold to the Berliet Auto Co., Lyons, France.

The design of the base and stanchion is the same as in the smaller size machine, that is, they are cast in one piece. This provides a rigid stanchion on which to mount the cutter slide. The base is broad, giving a good support for the work table. The table, when furnished for cutting bevel gears, is provided with rigid supports on each side of the base, which may be adjusted to suit various angles. These two supports, in addition to worm and worm sector and the clamping screw, insure ample support to the work in its angular positions.

The cutter slide is of extra length, giving a long, narrow guide to the cutter. This tends to maintain a more permanent alignment of cutter slide. The large diameter fly wheel on one end of the cutter spindle helps to steady the cutter and increases the efficiency of the machine.

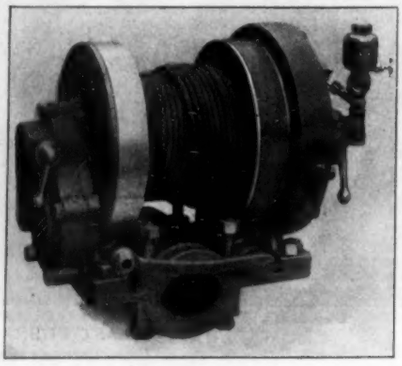
The vertical cutting, or anvil principle, works out particularly well on this larger size machine, as the very heavy gear blanks when resting in a horizontal position can be securely and rigidly clamped. The weight of the blank can be evenly distributed over the table, and the entire rim of the blank can be well supported. In the case of two bevel gears being roughed out at one time, for which the machine illustrated is arranged, the blanks are mounted rigidly on a tilted table and the entire rim or face of the blank is backed up by special hardened plates. The vertical cutting principle necessitates one tilting slide less than if the cutter slide tilted and the work were on a horizontal mandrel. This simplifies the construction of the tilting parts and increases the rigidity.



VERTICAL GEAR CUTTING MACHINE WITH MULTIPLE SPINDLES

In general, the machine is designed the same as the smaller size vertical cutting machine. It has a positive indexing mechanism. The quick change feed gear box makes it possible to get 16 changes of feed arranged in geometric progression without removing any change gears. A safety lever mechanism is provided so that the movements of cutter slide and indexing of work table are interlocked and one cannot operate while the other is in motion. All running and exposed parts are well guarded.

Take your men into partnership and make them responsible for the accidents. Make them understand that they are a part of the concern, and make them understand that they are the people who are getting hurt.



PORTABLE HOIST

Hoist of New Type

A portable hoist with a lifting capacity of 1,000 pounds recently has been placed on the market by the Ingersoll-Rand Co., New York. It is designed specially for use in mines and around manufacturing plants, power houses, railroad shops, ship yards, etc. The base of the hoist is arranged so that it can be bolted to a timber or it may be clamped to a circular member, such as a mine column, shaft, bar or pipe. The overall dimensions of the hoist are 21¼ x 16½ x 20⅛ inches, the latter being the height. The drum is six inches in diameter with a space of seven inches between the flanges. This will accommodate 700 feet of ¼-inch rope or 450 feet of 5/16-inch rope. The motor or engine is of the reversible square piston type, giving four impulses per revolution.

The Linde Air Products Co., of New York, has recently established distributing stations at 118 Harrison street, Davenport, Ia.; 514 Molino street, Los Angeles, Cal., and 324 North First street, Minneapolis, Minn. In addition to these distributing stations, a new plant for the manufacture of oxygen is now in operation at Kansas City, Mo. The Linde Air Products Co. now has 26 distributing stations throughout the country where a supply of oxygen is kept on hand for immediate shipment.

Pure Air for Underground Mines

How the Proper Ventilation of Mines Has an Important Influence on the Cost Per Ton of Iron Ore Produced

BY EDWIN HIGGINS

AN INVESTIGATION of ventilation in the metal mines of the United States is being made for the Bureau of Mines. Field work was started in the Lake Superior district early in 1913. Visits were made to nearly all the mines in Michigan and Wisconsin, and some of those on the Mesabi and Vermillion ranges in Minnesota.

All the mines visited, with the exception of two, depended on natural ventilation for the supply of air to the working places. Of the two exceptions, one mine had a blower fan installed underground, and in the other the air was kept in motion by means of compressed air jets. In a few cases booster fans were found in use in dead ends, especially in those immediately under the timber mat. The amount of air entering the mines per man employed underground varied greatly but in the majority of cases was between 50 to 100 cubic feet per man per minute.

Quality and Temperature of the Air in the Main Airways

The analyses of many air samples showed that seldom in the main airways did the air contain any appreciable amount of noxious gases. Invariably the heavily timbered mines showed a higher percentage of carbon dioxide in the return air, than did those mines in which little timber is used. Summer temperatures range from 50 degrees (nights) to a maximum of 100 degrees Fahr. (days) in the shade; in the winter temperatures range from the vicinity of 0 to a maximum of 30 to 40 degrees Fahr. below. In the deeper mines, 1,000 feet or more, the temperature underground showed little variation, no matter what the temperature on the surface. In the shallower mines, however, it is common in winter to encounter huge icicles, in some cases as deep as 300 feet from the collar of the downcast shaft.

Atmospheric air may be considered as consisting of approximately 20.93 per cent oxygen, 79.04 per cent nitrogen, and 0.03 per cent carbon dioxide. In mines, carbon dioxide (CO_2) is produced by the breathing of men or animals, the combustion of timber and explosives, the burning of lamps, and the decay of timber or other vegetable matter. When it is present in the air of mines there is usually a deficiency of oxygen. The first effect of breathing air containing 2 to 3 per cent carbon dioxide, is headache and dizziness; larger percentages cause extreme panting. When the air contains about 10 per cent of carbon dioxide life becomes imperiled. Candles in air are usually extinguished when the oxygen content decreases to 16 or 17 per cent. Carbon dioxide that may be present has but slight effect upon the extinguishment. Carbide lamps become extinguished when the oxygen decreases to about 12 per cent.

In addition to carbon dioxide there are produced by the combustion of explosives, depending on the kind used, varying percentages of hydrogen, methane, oxides of nitrogen, carbon monoxide, water vapor and hydrogen sulphide. It will suffice to say that very small percentages of either carbon monoxide, oxides of nitrogen, or hydrogen sulphide have marked effects upon the human system. One-tenth of 1 per cent of any of these gases have a serious effect upon the miner. Experiments by the Bureau of Mines indicate that the oxides of nitrogen and hydrogen sulphide are even more dangerous, in the same quantity, than carbon monoxide.

Gases Produced During Mine Fires

During timber fires in metal mines the noxious gases produced are carbon dioxide and carbon monoxide. Carbon monoxide (CO) is far more deadly than carbon dioxide. It is a product of incomplete combustion of wood or other combustible matter, or of the explosion of various types of blasting powder or dynamite. The amount produced is enormously increased when the explosive burns instead of detonating. Carbon monoxide is more than likely to be encountered during a smoldering fire, such as would result in a damp or wet mine. As little as 0.2 per cent of this gas will cause death if breathed for a sufficient length of time. It acts as a cumulative poison to the human system by combining with the haemoglobin of the blood, preventing that agent from combining with sufficient oxygen to support life. It gives little or no warning of its effect on the system. The person breathing it usually becomes suddenly weak in the knees and lapses into unconsciousness. Carbon monoxide may occur in quantities sufficient to cause sudden death, and still its presence will not be indicated by the dimming of the candle flame. Thus it may be seen that the belief of many miners that they can live wherever a candle will burn is erroneous.

Efficiency of Miners

That high temperatures and extreme humidity have a marked effect in lessening the efficiency of the miner there can be no doubt. By frequent observations in many Lake Superior iron mines I have noted repeatedly that miners working in temperatures above 75 degrees wet bulb (relative humidity 100 per cent) showed a marked falling off in energy. At wet bulb temperatures of from 80 to 90 degrees (relative humidity 90 to 100 per cent) the average miner works only from one-half to one-third of his time; when he is at work under these conditions his efficiency is not normal and when he is resting, of course, his time is entirely lost. In one mine, four miners produced the same tonnage of ore as was produced by nine miners in a similar place in the same mine where the temperature was 10 degrees hotter.

Many notes were made on the relative efficiency of miners working under normal conditions as compared with those working under severe conditions as to temperatures and quality of air. The following example, in which nominal figures are used, will serve to illustrate the effect of poor ventilation on the cost of mining.

A well-ventilated mine produces 1,000 tons of ore per day, at a cost of $1,000. The labor cost for this tonnage approximates $750. Now, if the places from which 300 tons of the production comes are poorly ventilated and hot, say 85 to 90 degrees, relative humidity 95 to 100 per cent, the miners will put in only one-half of their time in effective work. Thus they would then produce only 150

Mining Engineer, U. S. Bureau of Mines, Pittsburgh.

Presented at the Marquette Range meeting of the Lake Superior Mining Institute, Aug. 31, Sept. 1, 2 and 3.

tons, instead of 300, as under normal conditions; and the result would be that there would be produced 850 tons at a labor cost of $750, as compared with 1,000 tons at a labor cost of $750 under normal conditions. This would represent an increase from 75 cents per ton under normal conditions, to 88 cents per ton in a poorly ventilated mine—an increase of 13 cents per ton.

Even if the cost of mining were increased 5 cents per ton by a preventable cause it would occasion considerable concern to the management. Thousands of dollars are spent in operating equipment in order that a few cents may be saved in the cost of mining a ton of ore. The great importance of proper ventilation has been recognized by some, and efforts are now being made to improve conditions in this respect. The management of one mine, where production per man has been increased greatly, attributes the increase in a great measure to better ventilation facilities.

Causes of Vitiated Air in Mines

Oxygen is consumed, and carbon dioxide produced in mines, through the following agencies:

Oxidation or rotting of timbers.
Breathing of men.
Burning of various types of miners' lights.
Blasting.
Oxidation of certain rocks.

Investigation points to the rotting of timbers, in heavily timbered mines, as the chief cause of the vitiation of air. The breathing of men and the burning of candles and lamps come next in importance. In heavily timbered mines, especially where the mine is wet or damp, the timbers consume from three to four times as much oxygen as do all the other factors combined.

Causes of Heat and Humidity

In general, it may be said that heat is developed in mines through the following agencies:

Rock temperatures.
Presence of men and lights.
Crushing and working of rock and timbers, and possibly the oxidation of timbers.
Operation of machinery and presence of steam lines connected thereto.

The cause of humidity, of course, is the absorption of moisture in the mine by the comparatively dry air admitted from outside. In practically every case in the Lake Superior district the air issuing from mines was found to range between 95 and 100 per cent in humidity.

It was found that rock temperatures had practically no bearing on the great heat encountered in the sub-levels, especially those subs directly under the timber mat. In several cases rock temperatures, at depths of 1,500 to 2,000 feet, were as much as 10 degrees lower than air temperatures from 500 to 1,000 feet nearer the surface under the timber mat. Air currents passing through timbered workings where no men were employed were tested at various intervals, and the temperatures were found to increase gradually, regardless of whether the course of the air was downward or upward. With respect to working places, then, the other causes mentioned may be disposed of as of small importance in causing a rise in temperature, with the exception of the crushing and working of the rock and timbers, and the oxidation of the latter. While the laboratory investigations have not progressed far enough as yet to make a positive statement in this connection, it is my opinion, from observations made in the field, that in these mines the oxidation of the timber is the chief cause of the production of heat. In one mine a new sub-level was opened under the sub directly beneath the timber mat. Before the introduction of timber in this new sub, the temperature averaged 75 degrees; when drift sets had been put in the average temperature of the level was 80 degrees.

What the Problems Are

There are two problems presented in the proper ventilation of Lake Superior iron mines.

First.—The supply of a sufficient quantity of air, and its proper distribution, so that it will carry off the noxious gases produced, and have the effect of lowering the temperature and humidity existing in working places.

Second.—The production of lesser quantities of noxious gases.

As to the amount of air required in the mines it might be well to cite the requirements of coal mines in this country. In non-gaseous mines the average requirement is 100 cubic feet of air per minute per man employed underground and 500 cubic feet per minute per animal. In gaseous mines these figures are increased. On an average, perhaps 50 per cent of this air reaches the working faces, the balance being lost by leakage through stoppings and doors.

The conditions in the iron mines differ greatly from those in coal mines. The most important considerations are the oxygen consumed and carbon dioxide produced by the oxidation or rotting of timbers, and by the breathing of men and the burning of lights. In the iron mines the employment of animals exists only in occasional cases.

It is a difficult matter to state just how much air should be supplied in the heavily timbered mines for the reason that there is no accurate method of calculating how much oxygen the timbers will consume. The factors effecting this are extremely variable. Damp timbers are much more active in oxygen consumption than are dry timbers. Again, due to the methods of mining, it is impossible to figure with an degree of accuracy the amount of timber in a mine. However, a study of actual conditions led me to the belief that, in untimbered mines, where no animals are used, 50 cubic feet per minute per man employed underground is sufficient air. In mines where a moderate amount of timber is used there should be 100 cubic feet per minute per man employed underground. In the heavily timbered mines, it may be necessary to increase the amount to 150 or even 200 feet per minute, depending upon the amount of timber in the mine.

Determining the Amount of Air

There are several guides in determining whether or not there is a sufficient amount of air entering the mine. In the first place there should be sufficient air to prevent the humidity in working places from rising higher than 90 per cent. With 90 per cent humidity the wet bulb thermometer should not read more than 80 degrees in still air, and 85 degrees in a current of 400 to 500 feet per minute; with 100 per cent humidity these figures may be set at 75 and 80 degrees.

The second consideration is the diminution of the amount of oxygen in the air. As pointed out, this is closely related in the Lake Superior iron mines to the amount of carbon dioxide in the air. In England, ventilation requirements deal with the oxygen and the amount of carbon dioxide in the air. The requirements, not less than 19 per cent oxygen, or more than 1.25 per cent carbon dioxide, refer to coal mining, in which the ratio between the oxygen and carbon dioxide contained in the air is not as constant as it is in metal mines.

The Remedy

The principal remedy for the condition referred to is a sufficient air supply, and its proper distribution throughout the mine. Increased air supply may be effected: (a) by providing a greater number of openings to the mine; (b) providing for downcast and up-cast openings, with due regard to the elevation of the shaft

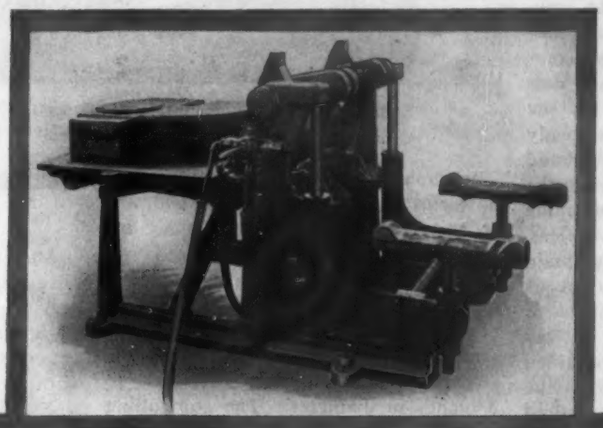
(*Continued on page* 454b)

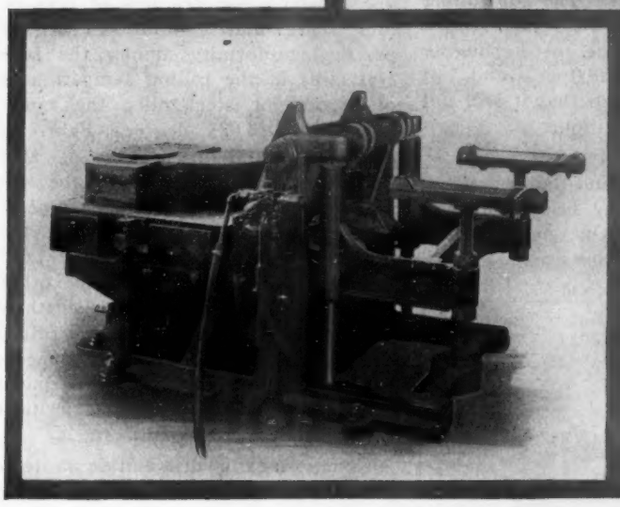
New Pridmore Molding Machine

Combination Electric Driven Jar-Ramming and Pneumatic Rock-Over Drop Machine

ONE of the principal features of the Henry E. Pridmore exhibit at the International Amphitheater, Chicago, Sept. 5 to 11, will be the new combination electric-driven jar-ramming and power, rock-over drop molding machine, shown in the accompanying illustrations. An effort has been made in designing this machine to combine simplicity with efficiency in operation. The machine consists of only three elements, a standard Pridmore electric jarring machine, a simple rock-over frame and three air cylinders. Two of the cylinders are utilized to roll over the flask and the third controls the draw mechanism. By a special arrangement of valves, only one lever is employed to control the roll-over, drop and return. When the flask has been placed on the table of the jarring machine and filled with sand, the operator pulls the clutch lever at the back of the machine and gives the mold the required number of jolts. Then the bottom board is clamped in place and the operator pushes the control lever on the side of the machine to the left, thus starting the roll-over operation. When the pattern board leaves the jarring machine table, it is automatically clamped to the roll-over frame. With his free hand the operator turns a little stop-cock and the vibrator begins its work. A push of the main control lever to the right brings the flask rest up to the proper position to receive the flask. The clamps are then removed and the controlling lever is moved slightly toward its neutral position. This exhausts the air from the draw cylinder and the mold is dropped away from the pattern. Again the control lever is pushed to the left and the pattern is rolled back onto the jarring machine table, where it is automatically released from the roll-over frame.

Special precautions have been taken to insure the maintenance of the correct alignment of the draw mechanism. The flask rests are fastened to a cross beam which supports the draw arms that travel vertically on two steel uprights which are fixed to the main frame of the machine. This is said to give an unyielding construction, placing the burden of maintaining alignment on the upright posts, rather than on the piston of the draw cylinder. The draw arms, which encircle the upright posts are split and fitted with rollers to reduce wear. The flask rests automatically adjust themselves to crooked or uneven bottom boards. The rests also can be spread 9 inches to accommodate longer flasks. This is provided for by four holes in the cross beam. The production on this machine is based, it is said, almost entirely on how fast the sand can be put into the flasks. Two laborers are necessary, one to operate the control lever and both to shovel sand. In some instances, it is more advisable to have three men in order to shovel the sand more rapidly. Where large quantities of duplicate castings are produced it will pay to feed the sand to the flask through a gravity chute.





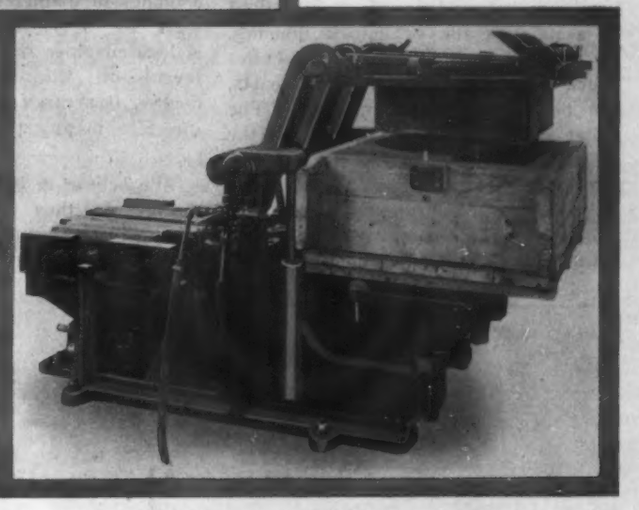


FIG. 1—POWER ROCK-OVER DROP MACHINE WITHOUT JARRING ATTACHMENT

FIG. 2—PATTERN IN POSITION ON JARRING TABLE READY TO RECEIVE FLASK

FIG. 3—FLASK RAMMED, ROCKED OVER AND DROPPED AWAY FROM PATTERN

To say that the workmen are experienced is no argument for leaving dangerous places unguarded. An oiler killed between a pulley and a belt in a Minneapolis flour mill had been at that job for 12 years. His life could have easily been saved by boxing the pulley.

Two Purpose Turret Lathe

The International Machine Tool Co., Indianapolis, is marketing a heavy turret lathe which is so designed that it can be transformed from a chucking machine into a bar machine, or vice versa, in a few minutes' time without any alteration in the machine itself. This is accomplished by means of a specially designed collet chuck, as shown in the accompanying illustration. Fig. 1 shows an 18-inch turret lathe with the new collet chuck mounted in position for bar work, and Fig. 2 shows the same machine 15 minutes later with the collet chuck housing and body removed. As soon as the chuck housing and body are removed, an ordinary four jaw, combination chuck or a three jaw universal chuck can be mounted on the spindle and the lathe then is ready for chucking work. It is claimed that the complete change from the bar machine to the chucking machine is accomplished in 20 minutes or less. The headstock, including the main driving gear, remains undisturbed as well as the other operative parts of the machine.

The collet chuck is a self-contained unit. The housing which carries the lever control and the fork is bolted to a pad on the headstock housing. By removing four bolts, the collet chuck housing, with all of its parts, can be taken off the machine. The collet chuck body screws on to the threaded nose of the spindle and like the housing can be quickly removed as one unit. A taper seat on the spindle locates the collet chuck or a standard chuck firmly and accurately.

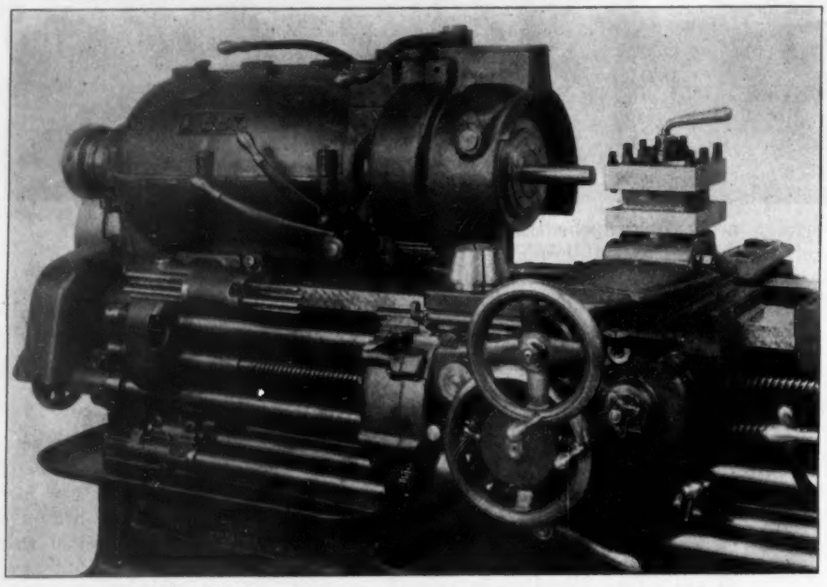


FIG. 1—TURRET LATHE WITH COLLET CHUCK MOUNTED IN POSITION FOR BAR WORK

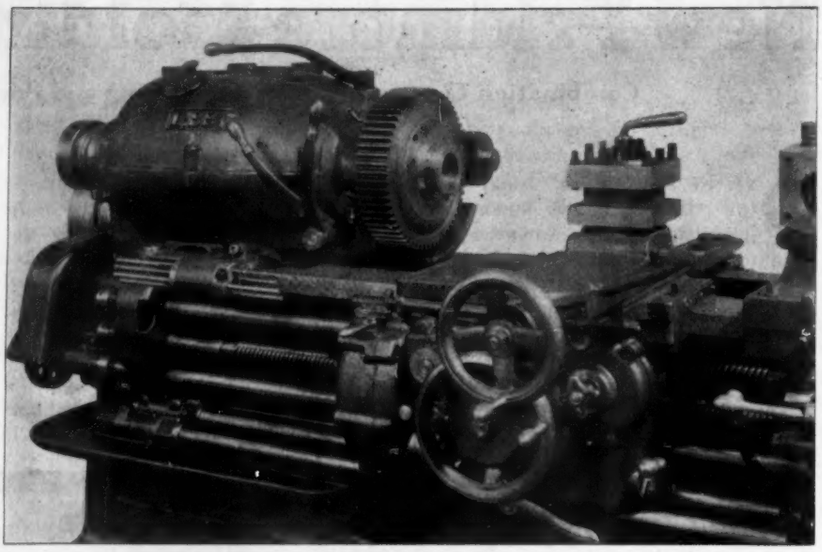


FIG. 2—TURRET LATHE WITH COLLET CHUCK HOUSING AND BODY REMOVED

The collets are designed to have a powerful grip on the stock and are so arranged that they retain their approximate position when there is no stock in the chuck. They are made in four segments and each set is adapted to a ⅛-inch variation in the diameter of the stock. The chuck has a capacity for bars from ¾-inch to 3 inches in diameter. The controlling lever for operating the collet chuck is located close to the speed-changing levers on the headstock, and, of course, is arranged so that it will not interfere in any position.

"We believe in having the men devise the guards, then they believe in them and will use them. Our guards are all home made and inexpensive."

Finishing Temperatures of Rails

An investigation of the finishing temperatures and properties of rails recently was conducted by the Bureau of Standards of the United States government. Observations were made with an optical pyrometer of ingot and finishing temperatures of rails in four representative mills. There is practical uniformity among the several mills in the rolling temperatures of ingots for steel rails, the range being from 1,975 degrees Fahr. to 2,085 degrees Fahr. There is also very little variation among the various mills in the finishing temperature of the rails as observed at the hot saws, the range being about 1,650 to 1,815 degrees Fahr. In other words, the four mills all finished their rails close to an average temperature of 1,715 degrees Fahr. This temperature is 520 degrees above the mean value, 1,230 degrees, of the critical temperature of these rail steels.

Concerning the distribution of temperatures within the head of a cooling rail, it is shown that the center of the head is some 120 degrees hotter than the optical pyrometer readings of the surface temperature; therefore, the center of the head is finished on the average about 615 degrees above the critical range for 100-pound sections.

The Bayley Manufacturing Co., Milwaukee, builder of fans, blowers, heating and ventilating apparatus, engines, etc., has just issued a new catalog covering its products. This catalog is attractively arranged and contains information of value to architects, engineers, etc.

Pointers for Blast Furnacemen

A Few Suggestions for Blast Furnace Operators Based on Practical Experience with a Large Plant

BY A J BOYNTON

THE ADVANTAGE of hot blast is not altogether and perhaps not chiefly in the heat which it carries into the blast furnace but in the combustion temperature which it produces. That the effect of increase in the difference between combustion temperature of gases and melting point of slag is much greater than that due to the amount of heat carried in by the blast has been clearly pointed out as a reason for the effectiveness of both hot blast and dry blast. Similarly the economy of acid slags is not determined entirely by the quantity of heat required to melt the slag but also by the temperature of melting.

Increase in coke consumption and the corresponding decrease in tonnage does not, however, by any means represent the sum total of the disadvantage of running with basic slag. Such a slag carries too little silica to absorb the lime present in the region of the top of the bosh. The lime is consequently rejected by the slag at this point and some of it remains as the chief cause of scaffolds on the bosh. The serious consequences of the formation of these scaffolds are well understood, and include irregular iron, excessive production of flue dust and interrupted operation.

Requirements Not Easily Fulfilled

The requirements for the use of acid slags and high blast temperature are not easily fulfilled. They include correct furnace lines, uniformity of raw materials, since the furnace heavily burdened and running on an acid slag is extremely sensitive to variations in the charge, low sulphur content in the coke, correct distribution, and sufficient stove equipment to generate the temperature required. It is seldom that all of these requirements are fulfilled. Consequently, in many cases where the use of acid slags and high heats has been attempted, no consistent increase in burden was possible, and the results have been chiefly noticeable in iron alternately too hot and too cold, and in the presence of scouring slags, together with an undue wearing of the lining through the elevation of the temperature at any given level inside the furnace.

A comparison of Bessemer slags made at Lorain, covering 120 furnace months, shows a gradual increase in sulphur as the basicity increases. The most acid slag carries 1.64 per cent sulphur, and the most basic over 2 per cent. The slags range from 37 per cent to 32½ per cent silica, and from 1.2 to 1.5 ratio of bases to silica. The unit taken is the average composition of the slag from one furnace for one month.

The advantage of running on the more acid slag is indicated by the coke practice corresponding to these averages, the average coke consumption for 20 months with the most acid slag being 1,922 pounds per ton and for 15 months with the most basic slag 2,269 pounds per ton.

Trouble From Sulphur

Where a consistent removal of sulphur is specified, few of our blast furnace plants have been in a position to avail themselves of the advantage of acid slag on account of the amount of sulphur in the charge, almost all of which is contained in the coke. With an ore supply containing 7½ per cent silica and 2,000 pounds of average Connellsville coke, the normal slag volume is a little over 900 pounds per ton of iron. With an acid slag capable of carrying not over 1.64 per cent sulphur at the temperature of the Bessemer hearth, the limit of sulphur in the coke for the normal slag volume is 0.8 per cent.

At the hearth temperature of a furnace making basic pig iron, with the same kind of slag, where the silicon is determined by the hearth temperature, the sulphur content of the slag will be about 1.2 per cent. This sulphur capacity in the slag requires sulphur in the coke below 0.6 per cent for the normal slag volume. Any increase in sulphur in the coke above these points must be met in one of two ways, either by increasing the basicity of the slag or by increasing its volume.

Aside from furnace lines and quality of raw materials, nothing has greater effect on the ability to carry heavy burden than the distribution of the charge on the bell. Some years ago we made, at Lorain, a series of experiments continuing over some months, first with small models and afterwards on the full scale. These experiments showed the extreme difficulty of obtaining in a skip filled top, with materials differing from each other as widely as coke and stone differ from ore, a distribution which is correct by weight and also with respect to proportion of coarse and fine material on each quarter of the bell. That more or less direct reduction takes place as a result of relatively greater compactness of the charge on one side of the furnace is unquestionable. Even where high blast heat can be applied to remedying this condition, it is still to some extent waste of the hot blast, as applying it to do work in the hearth which should have been done above. In many cases a limiting condition to the use of hot blast is found in this cause, inasmuch as a furnace with even slightly improper distribution reaches the limit of burden on one side only.

Bad distribution is also a very frequent cause of excessive production of flue dust, a condition for low production of which is the continuous and uniform movement of the charge practically as one mass. Experience has shown that with such a movement a relatively slight production of flue dust takes place, and that it is not the average velocity of gases in the top but the excessive velocity due to slips which throws over the dust. The margin of velocity, however, is so slight that even very slight slipping will greatly increase the dust production.

Importance of Proper Distribution

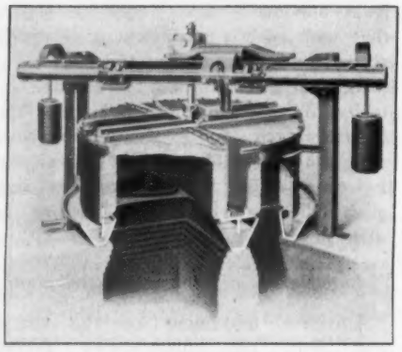
Uniform movement of the charge can only take place with perfect stock distribution. Any other distribution will result in a movement which may be steady on one side and intermittent on the opposite side, resulting in more or less of a vertical shearing of the charge which is a most usual cause of excessive flue dust. The fact that good practice under favorable conditions has been made with a distribution that is not perfect is not, in my judgment, a good reason for neglecting the utmost possible refinement in distributing the charge. This refinement should include, in the case of skip filled furnaces, the experimental determination of the best possible proportions of receiving hopper and throat, and of the position, angle and speed of dumping of the skip car; the removal of all obstructions to the flow of stock, such as crossheads for supporting the main bell, and lifting and holding lugs cast on its surface; a sufficient slope, probably not less than 50 degrees for the main bell, and the machining of its entire surface; the absolute centering and alignment of every part of the charging machinery with the furnace; the governing of extent and speed of travel of the bells, and the rotation of the charge in the throat. With regard to this last fea-

A discussion of the paper on American Blast Furnace Practice by Hermann A. Brassert, presented as a part of the proceedings of the 1914 spring meeting of the American Iron and Steel Institute. The author, A. J. Boynton, is in charge of the blast furnaces of the National Tube Co. at Lorain.

ture it should be noted that, even though it is possible under any carefully observed set of conditions, to effect a perfect distribution in a stationary top, the conditions of operation, including variation in the proportion of coarse and fine material in the coke and limestone, and of the water in the ore, together with the practical impossibility of maintaining the angle and speed of dumping constant at all times, will result in an error which we cannot afford to overlook. The rotation of the charge is by no means a cure-all for imperfect distribution, but it seems to me to be essential to the high degree of refinement which is necessary for the best possible practice.

Advantages In High Temperatures

The advantages of running with a high blast temperature, when the establishment of the conditions referred to above has made its use easy and natural are well understood and generally admitted. In saying this I have in mind



FOUR-PORTED BRICK LINED REVERSING VALVE

not so much the use of excessively high temperatures, as a general increase in the temperatures now in use, which average between 900 and 1,000 degrees. However, the prospect of working with leaner ores and higher slag volumes makes it seem probable that an increase beyond the highest temperatures now regularly used may be expected, since it is generally true that in districts where lean ores have to be smelted, the average blast temperature is much higher than it has been in the district using Lake ores. The question of stove capacity and design is, therefore, of much interest.

The average stove capacity of our furnaces 21 feet 6 inches and over in bosh diameter is about 175,000 square feet of heating surface, distributed in almost every case among four stoves. These stoves are generally of the two pass side combustion or three pass type. The consideration which has governed the size of these stoves has been primarily ability to get the temperature desired,

(*Continued on page* 454c)

Brick Lined Valve

The Morgan Construction Co., Worcester, Mass., will furnish 16 40-inch, 3-ported brick lined and water sealed Dyblie valves for the open-hearth furnaces and four, 30-inch, 4-ported valves of the same type for the soaking pits at the new steel plant that Corrigan-McKinney & Co. are building at Cleveland. The brick lining in these valves is a comparatively new feature. Originally the valves were provided with water cooled drums and this type is still being built by the Morgan company. The brick lined type has been designed for plants having acid water, or where it is necessary to economize in the use of cooling water. They are also especially desirable where the stack gases are passed through waste-heat boilers, inasmuch as the brick linings absorb comparatively little heat from the gases passing through the valves.

The quantity of cooling and sealing water is reduced to a minimum and all that is now required is enough to keep a slight circulation through the seal pan. The only plate work which comes in contact with the water is the seal-ring riveted to the bottom of the drum. This can be easily removed. Where the water is particularly bad, the seal-ring is made of castings which make the valve practically immune from acid attack. The valves are provided with self-contained hydraulic operating mechanism, which has been a feature of Morgan reversing valves for many years.

Exhibition Mine

The plans for the mine beneath the floor of the palace of mines and metallurgy at the Panama-Pacific Exposition, San Francisco, have now progressed under the direction of the Bureau of Mines to the point where it is expected that the most comprehensive exhibit of mines and mining subjects, including mining equipment and supplies, which has ever been prepared for the education of the general public will be presented.

Characteristic working places, or stopes, will be prepared in the mine to simulate the character of the ore or coal, and the methods of working will be shown in one of the rooms of the mine. Such workings as open-pit copper and iron mines and stone quarries, which cannot otherwise be shown in such an exhibit, will be illustrated by motion pictures.

Some interesting tests showing the effect of sea water on concrete are embodied in a booklet recently compiled by the Aberthaw Construction Co., of Boston. The facts given in the book are based on an investigation made by the Aberthaw Construction Co. and Herbert L. Sherman, chemist, at the United States navy yard, Charlestown, Mass. Data regarding both the mechanical and chemical action of the water and varying temperatures upon concrete of several different compositions are given. The booklet simply contains a statement of the facts as determined by the chemists and the engineers and the reader is left to draw his own conclusions.

New Bench Leg

A steel bench leg of new design recently has been placed on the market by the New Britain Machine Co., New Britain, Conn. This leg is designed to make possible a stiff bench construction without any dependence upon the wall. It may be planked in a variety of manners, thus meeting a wide range of factory conditions.

NEW BRITAIN BENCH LEG

Provision is made for shelf and bin construction underneath the bench where required. The construction is such that it does not interfere with sweeping or with steam pipes which may be located at the back of the bench.

Adjacent sections are connected by longitudinal stringers which enable the legs to be placed as far as eight feet apart with resulting economy of labor and lumber. The stringer gives great rigidity to the back portion of the bench and prevents its deflection. It also assists in preventing end sway. Additional stiffness is given by the back board which is screwed to the face of the upright in the rear and forms a screen to prevent work from being pushed off the bench. The rear portion of the leg is separated from the front. The legs are formed to *U* sections which face each other thus enabling shelving supports to be put in between the flanges of the legs and securely retained in place.

Hoisting Crane on Motor Truck

Interesting Device for Handling Heavy Loads With the Truck Motor, Saving Time and Energy

MANUFACTURERS in every line of business where motor trucks are used are finding it necessary to provide some means for handling heavy loads to and from the trucks. Usually the owner has a method of doing this work at his own plant, either with cranes or by rolling the material from elevated platforms, but out on a trip the truck rarely finds any arrangement for handling heavy loads.

The accompanying illustration shows a one-ton, pillar jib crane, which is carried with the truck that has proved efficient in handling heavy loads. The truck was built by the Peerless Motor Car Co. and the crane was furnished by the Brown Hoisting Machinery Co., both of Cleveland. The pillar is located in the center of the chassis directly behind the driver's seat, and the hoisting and lowering of the load is accomplished by means of clutches, gearing and chain connections to the truck motor. The crane is constructed of structural steel shapes and rotates on a steel pillar casting bolted to the chassis. It is equipped with thrust roller bearings to permit easy rotation.

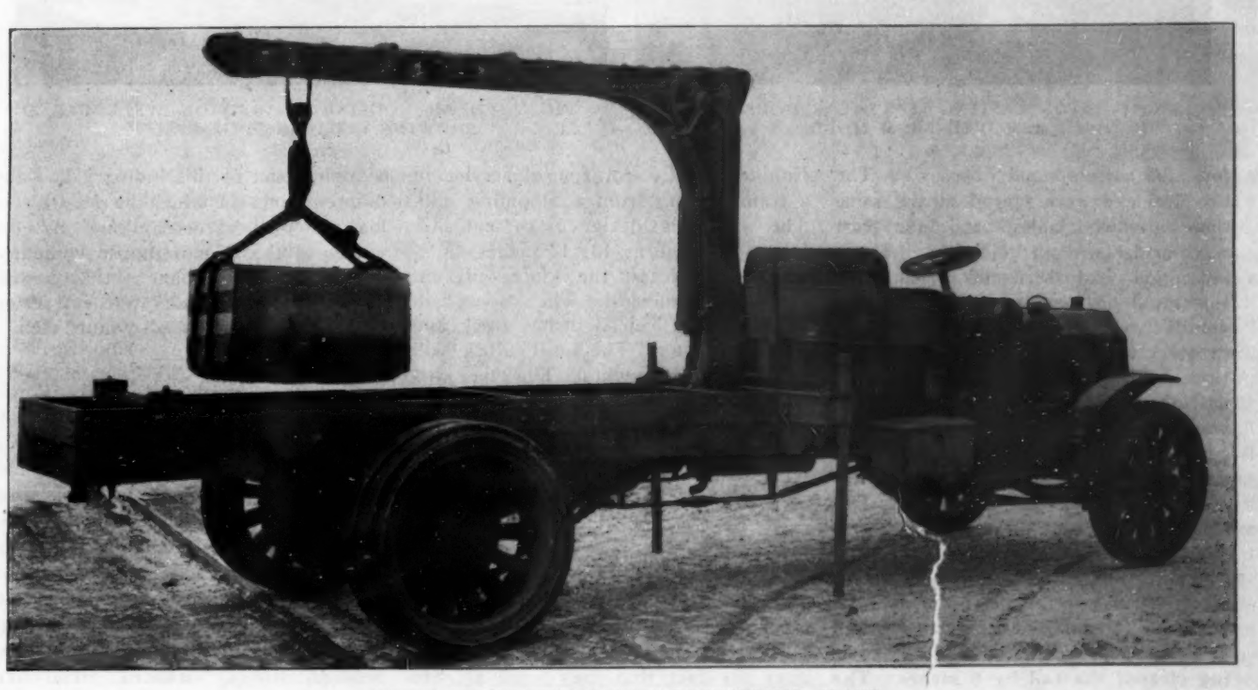
The hoisting shaft stands vertical, running from the top of the crane through the steel pillar down to the center of the chassis where it is connected to the main hoisting shaft which in turn is connected to either the transmission shaft or a countershaft. The connection is made through roller chains working on sprocket wheels. There is an intermediate idler shaft provided because the speed of the engine is too great for hoisting and lowering loads. A single jaw clutch is provided on the transmission shaft or countershaft by means of which the crane mechanism is thrown into power. The main hoisting shaft is equipped with a double jaw clutch which is operated by lifting or lowering the lever shown in the illustration directly behind the driver's seat. This clutch throws either one of two bevel gears in mesh with the gear secured to the vertical hoisting shaft.

At the top of the vertical hoisting shaft is a bevel gear which meshes with a gear secured to a horizontal shaft on which there is a chain sprocket wheel. A hoisting chain passes from this sprocket wheel, runs out along the jib to the trolley and from the latter over the sheave in the bottom-block, being dead-ended on a pin in the end of the jib. The dead-end at the hoist sprocket wheel falls into an open box located on the crane mast.

To hoist a load the operator throws in his clutch on the transmission shaft or countershaft and then pulls the operating lever up to the hoisting notch which throws the crane mechanism in power and the load is hoisted. For lowering the load, the operating lever is pushed down to the lowering position which reverses the crane mechanism and causes the load to be lowered. By means of a safety device, the load cannot be lowered without connecting up with the engine.

The crane jib is constructed of two channels, with flanges turned in and the crane trolley, being equipped with four wheels, runs in and out on the lower flanges of these channels. The trolley is moved by means of a hand chain and sprocket wheel as shown in the illustration.

The crane with its load can be pushed around to either side by hand. The truck is equipped with out-riggers which are supported on wrought iron pipes when the load is too great for the chassis. For further protection against any overloading of the truck frame, if necessary it can be reinforced by structural work on top, as is shown in the illustration.



MOTOR TRUCK FITTED WITH BROWNHOIST CRANE

Casting a Large Shear Housing

How the Hubbard Steel Foundry Co. Produced a 70-Ton Casting with Open-Hearth Capacity of 55 Tons

THE Hubbard Steel Foundry Co., East Chicago, Ind., has made two unusually large steel castings for the Morgan Engineering Co., Alliance, O. Each casting weighs 70 tons and will house a shear for cutting blooms, billets or slabs. One is for the Pennsylvania Steel Co. and the other for the Minnesota Steel Co., Duluth.

The Hubbard Steel Foundry is equipped with a 30-ton and a 25-ton open-hearth furnace. Through efficient management, these furnaces produced 80 tons, giving sufficient steel for the casting and additional metal for the risers and sprues. The two furnaces were tapped at the same time in two ladles, and the cast was made without difficulty. Every precaution had been taken to have the mold in perfect condition. All details were looked after with the greatest care to avoid any imperfections in the completed work and the casting, when removed from the mold, was found free from flaws.

In Fig. 1 the casting is shown on the foundry floor after being cleaned. It is resting upright in this illustration, but was cast on its side. Fig. 2 shows the casting loaded on a well car for shipment to Alliance. Two steel shafts were made, on which the casting rested. These were blocked to a sufficient height so that the casting cleared the rail by 6 inches. The larger shaft, shown in the foreground, was 18 inches in diameter and the smaller, the end of which may be seen at the right of the illustration, was 9 inches in diameter. The lower part of the casting can be seen suspended below the side girder of the car and extending almost to the rail. The clearance over the top for passing bridges was about 6 inches.

The over-all width of this casting is 9 feet, the over-all height 12 feet 7 inches, and the over-all length 18 feet 5 inches.

The shear, for which this housing was made is designed by the Morgan Engineering Co. for special service in a train leading from a blooming mill. The shear is designed to cut hot billets as large as 12 x 12 inches. Unlike most shears, the knife will cut from below upward. The knives will be 12 inches deep, 3 inches thick and 30 inches long. The knife block will be 30 x 12 x 14½ inches. The lever carrying the knife is to be 16 feet 5 inches long, from the center of the shear block to the center of the pivoted bearing.

FIG. 1—70-TON CASTING FOR SHEAR HOUSING AS REMOVED FROM MOLD

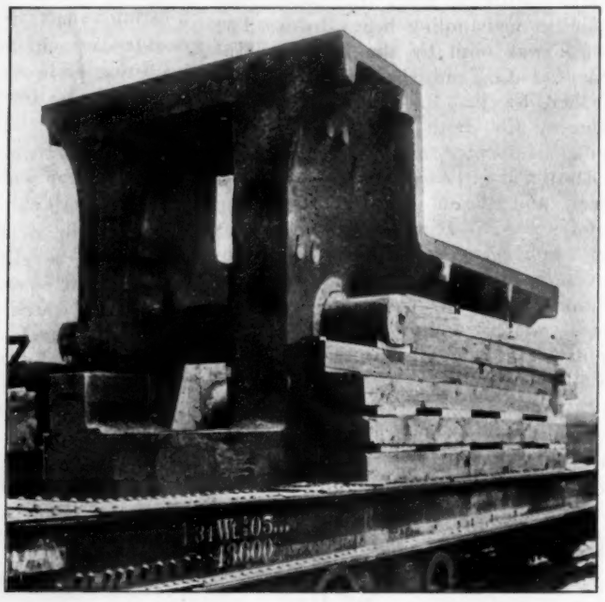


FIG. 2—SHEAR HOUSING LOADED ON WELL CAR, SHOWING CLEARANCE OF RAIL

Officials Are Elated

Officials of the Hubbard Steel Foundry Co. believe this is one of the largest steel castings ever produced in a western foundry. They are elated over the fact that they were able to turn out so complicated a casting without difficulty and without special equipment. Owing to the fact that water is encountered a short distance below the surface at East Chicago, it was impossible to pour this casting in a pit.

"The Young Man and the Electrical Industry" is the title of a story written by James H. Collins, the well-known magazine writer, which has just been issued by the Westinghouse Electric & Mfg. Co. The little book deals with the opportunities offered a young man in this industry and the different lines in which he may direct his activities as exemplified by the works of the Westinghouse company. The company announces that it will supply a copy to any one interested in the development of young men.

The Portsmouth Steel Co., Portsmouth, O., recently has issued an attractively printed booklet describing the manufacture and uses of Portsmouth rust-resisting iron. This iron is produced in open-hearth furnaces and modern rolling mills. Its composition is such that it resists corrosion effectively and it is particularly suitable for culverts, stacks, roofing, tanks, standpipes, metal doors, gas holders, stoves, furnaces, metal barrels and ship plates.

All Eyes Are on Chicago

Arrangements for the Annual Foundry Convention and Exhibition Are Completed

A. E. HOWELL,
Pres., A. F. A.

FOR THE third time in a little over a decade Chicago acts as host for the conventions of the allied foundry associations, and as such is once more the center of interest for the foundrymen of America. In addition, Chicago, up to date, is the only city to be honored with the convention two years in succession, but as the greatest foundry center in the world, with 170 individual casting plants, this distinction is merited. The 1914 convention will prove unique in many ways. The purely sight-seeing element, which never has been a large factor in the attendance at the foundry conventions, this year will be almost completely eliminated, since it is hardly to be expected that those who attend merely for sight-seeing purposes would be interested in visiting Chicago two years in succession. The aggregate number of visitors, however, from present indications, will fully equal the tremendous total which was rolled up last year and will include only those who are seriously interested in the advancement of the foundry industry. The American Foundrymen's Association will discuss over 40 individual papers and reports, covering every phase of gray iron, malleable and steel foundry practice. The program of the American Institute of Metals is proportionately heavy and the Associated Foundry Foremen have arranged for a series of informal discussions of foundry practice. The programs have been carefully made up and related subjects will be considered in groups so that foundrymen who are interested in only one or two topics, and who are limited as to time, need to attend but one or two sessions in order to cover thoroughly their own particular subjects. Special attention is called to the Cost Congress, which will be held at the Stock Yards Inn on Wednesday morning, Sept. 9. This session will be addressed by speakers of national reputation and the vital subject of foundry costs will be thoroughly covered from every angle. Like its predecessor, the 1914 exhibition of foundry and shop equipment will be housed in the International Amphitheater, Forty-second and Halsted streets, Chicago. This structure is located within 20 minutes' ride from the loop district of the city and is reached by the South Side elevated railway and by six surface car lines. Also, it is readily accessible by automobile, via Forty-third street, which connects with all of the north and south boulevards. The exhibition will open on Saturday morning, Sept. 5, and will remain open continually during the day and evening until 6 p. m, Friday, Sept. 11, Sunday, Sept. 6, excepted. It has been suggested that companies which have a large number of men to send to the exposition will take advantage of the opportunity afforded them to have their employes attend in relays, thereby obviating interference with shop operations. The conventions of the allied organizations, including the American Foundrymen's Association, the American Institute of Metals and the Associated Foundry Foremen will be held simultaneously from Tuesday until Friday, Sept. 8 to Sept. 11. The registration booths, however, will be open on Monday, Sept. 7. Headquarters have been established by the American Foundrymen's Association at the La Salle Hotel, which will also be the headquarters for the American Institute of Metals. The Associated Foundry Foremen will have their headquarters at the new Fort Dearborn Hotel on Van Buren street, adjacent to the La Salle street station. The headquarters of the Foundry & Machine Exhibition Co. are at the Sherman Hotel. The meetings will commence Tuesday morning, Sept. 8, at 10 a. m., at the La Salle Hotel, with a joint session of the three associations. The customary addresses of welcome and response will be given at this time, together with the annual addresses of the presidents of the allied associations. Following these features, seven important papers on safety in foundry operations will be read and discussed. On Tuesday the associations will have individual sessions, and on Tuesday evening the visiting foundrymen will enjoy a boat ride on Lake Michigan on the steamer *Theodore Roosevelt*. Wednesday morning, at 10 a. m., in the Palm room of the Stock Yards Inn, adjacent to the exposition, will be held the joint Cost Congress of the American Foundrymen's Association and the American Institute of Metals. On Wednesday noon the ladies will be tendered a luncheon at the Stock Yards Inn. Professional sessions will be held by both societies on Wednesday afternoon and continuously thereafter until Friday noon.

Condensed Program

Saturday, Sept. 5.

10:00 A. M.—Opening of the exhibition at International Amphitheatre.

Monday, Sept. 7.

10:00 A. M.—Registration, La Salle Hotel.

7:00 P. M.—Banquet, Associated Foundry Foremen, Fort Dearborn Hotel.

Tuesday, Sept. 8.

10:00 A. M.—Joint Session, American Foundrymen's Association, American Institute of Metals and Associated Foundry Foremen.

2:00 P. M.—Professional Sessions, A. F. A. and A. I. M., La Salle Hotel.

7:30 P. M. — Lake Ride, Steamer Roosevelt.

Wednesday, Sept. 9.

10:00 A. M.—Joint session, A. F. A. and A. I. M., Stock Yards Inn.

1:00 P. M.—Ladies' luncheon, Stock Yards Inn.

2:00 P. M.—Professional sessions, A. F. A. and A. I. M., Stock Yards Inn.

8:00 P. M.—Visit to the "White City."

Thursday, Sept. 10.

10:00 A. M.—Professional sessions, A. F. A. and A. I. M., Stock Yards Inn.

2:00 P. M.—Professional session, A. F. A. and A. I. M., Stock Yards Inn.

7:00 P. M.—Annual convention banquet, La Salle Hotel.

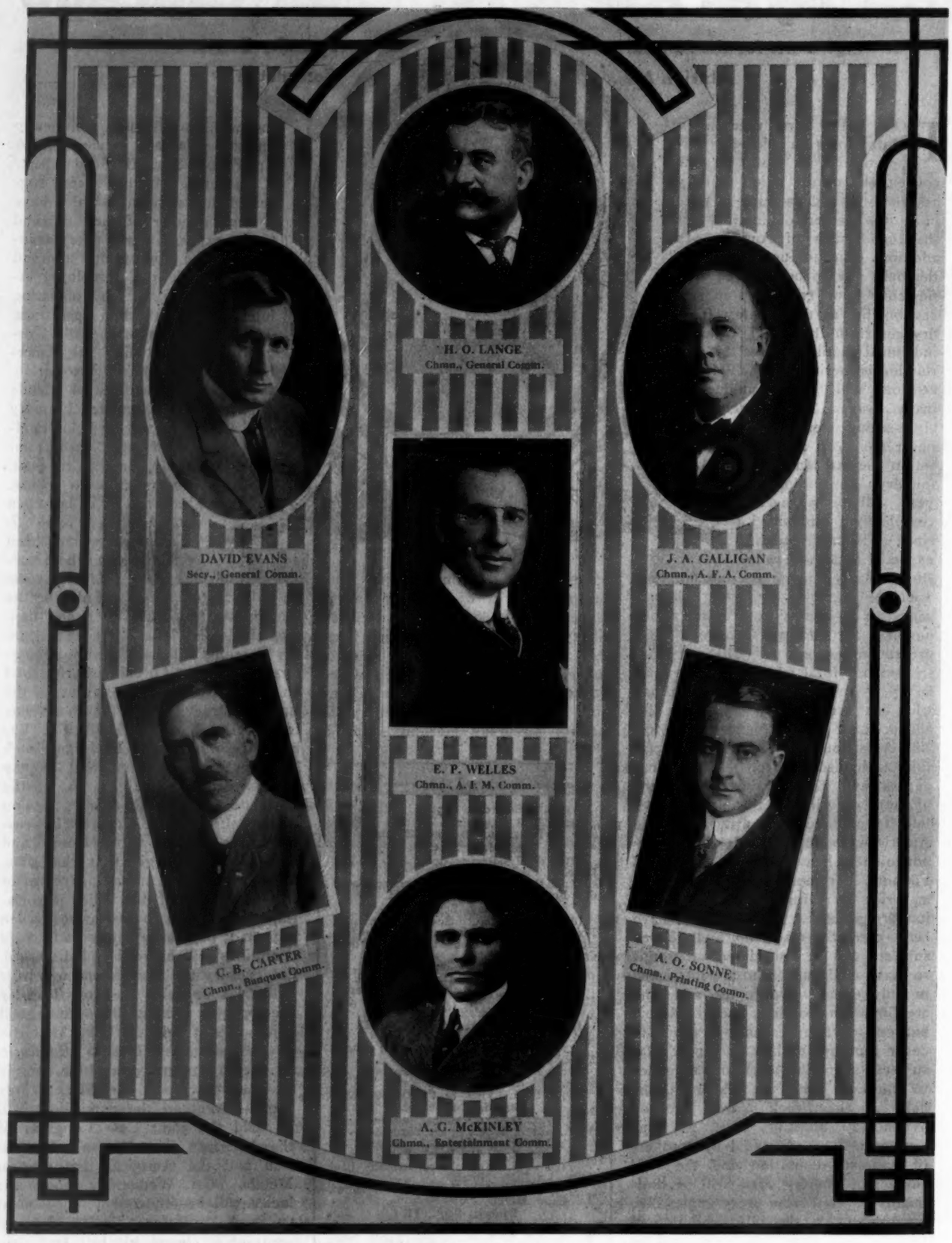
7:00 P. M.—Annual banquet for ladies, La Salle Hotel.

Friday, Sept. 11.

10:00 A. M.—Professional sessions, A. F. A. and A. I. M., Stock Yards Inn.

12:30 P. M.—Sight-seeing tour, train leaves International Amphitheatre.

6:00 P. M.—Exhibition closes at International Amphitheatre.



PROMINENT MEMBERS OF THE LOCAL COMMITTEES AT CHICAGO

The A. F. A. Program

Tuesday, Sept. 8, 10 a. m., La Salle Hotel.

Joint session, American Foundrymen's Association, American Institute of Metals and Associated Foundry Foremen

1—Address of Welcome, by H. O. Lange, Chairman, General Committee.

2—Annual Address, Alfred E. Howell, President, American Foundrymen's Association.

3—Annual Address, G. H. Clamer, President, American Institute of Metals.

4—Annual Address, S. V. Blair, President, Associated Foundry Foremen.

5—"Safety in Foundry Operations", illustrated address by M. W. Alexander, West Lynn, Mass.

6—"Notes on Safety Organization", illustrated address by A. W. Gregg and G. F. Kent, Milwaukee.

7—"Sanitation and Safety First Applied to the Brass Industry", illustrated address by F. Moerl, Chicago.

8—"Progress in the Safety First Movement", illustrated address by Arthur T. Morey, Granite City, Ill.

9—"Safety First", by F. W. Reidenbach, Rochester, N. Y.

10—"Safety in Connection with Grinding Wheel Operations", by R. G. Williams, Worcester, Mass.

11—"Safety First—Driving Back the Saloon", by Thomas D. West, Cleveland.

Tuesday, Sept. 8, 2 p. m., La Salle Hotel.

Individual session, American Foundrymen's Association.

12—Annual report of executive committee.

13—Annual report of Secretary-Treasurer.

14—"Electric Motors and Controllers for Foundry Operations", by S. H. Libby, New York.

15—"The Two-Story Foundry," by G. K. Hooper, New York. York.

16—"Economics of Motor Drive", by H. F. Stratton, Cleveland.

17—"The Selection of Grinding Wheels for the Foundry", by Carl Frederick Deitz, Worcester, Mass.

18—"Refractories—Their Selection and Use in the Foundry", by Walter H. Kelley, Pittsburgh.

19—"Molding Sand Tests", by Dr. Richard Moldenke, Watchung, N. J.

20—"Report of the Committee on Industrial Education", by Paul Kreutzpointner, Altoona, Pa.

"A New Design for Cupola," by G. R. Brandon, Harvey, Ill.
"Abrasives," by Clarence Hawke.

Tuesday, Sept. 8, 7:30 p. m.

Lake Ride, Steamer *Theodore Roosevelt*, Dock foot of Clark street bridge.

Wednesday, Sept. 9, 10 a. m., Palm Room, Stock Yards Inn.

"Cost Congress," joint session, American Foundrymen's Association and American Institute of Metals.

21—"Foundry Cost Keeping", address by F. J. Stephenson, Cost Expert, National Association of Stove Manufacturers, Hoosick Falls, N. Y.

22—"Efficiency in Foundry Operations, the Essential Factor in Reducing Production Costs", address by A. K. Hathaway, Philadelphia.

23—"Prevailing Practice in Estimating the Selling Price of Castings", by A. O. Backert, Cleveland.

24—"Scientific Management in the Foundry", by Frederic A. Parkhurst, Detroit.

25—"Revision of the A. F. A. Standard Foundry Cost System", by Harrington Emerson and J. K. Mason, New York.

26—"Elimination of Waste in Bench Molding", by J. C. Pendleton and R. E. Kennedy, Urbana, Ill.

27—"Industrial Pioneering, or the Establishment of a Foundry in a New Territory", by L. E. Anthes, Toronto.

28—"The Training of Foremen, Superintendents and Managers of Foundries", by E. A. Johnson, Boston.

29—"Dangers of Specialization", by Thomas D. West. Cleveland.

Wednesday, Sept. 9, 1 p. m.

Ladies' Luncheon, Stock Yards Inn.

Wednesday, Sept. 9, 2 p. m., Palm Room, Stock Yards Inn.

Individual session, American Foundrymen's Association.

30—"Calculating Mixtures for Malleable Cast Iron", by Harrold Hemeway, Moline, Ill.

31—"Effect of Varying Silicon and Carbon in Malleable Iron Mixtures", by A. L. Pollard, Batavia, N. Y.

32—"Some Remarks on the Strength and Ductility of Malleable Cast Iron after the Skin has been Removed", by Enrique Touceda, Albany, N. Y.

33—"Malleable Iron, Its Manufacture, Characteristics and Uses", by J. P. Pero, East St. Louis, Ill.

34—"Researches in the Annealing Process for Malleable Castings", by Oliver W. Storey, Madison, Wis.

Thursday, Sept. 10, 10 a. m., Palm Room, Stock Yards Inn.

Individual session, American Foundrymen's Association.

35—"The Electric Furnace in the Steel Foundry", by W. L. Morrison, Welland, Ont.

36—"Making Steel Direct from Ore in the Electric Furnace", by Prof. T. A. Louden, Toronto, Ont.

37—"Side-Blow Converter Practice", by John Gregson, Milwaukee.

38—"Manufacture of Acid Steel for Castings", by A. F. Blackwood, Detroit.

39—"Notes on the Microstructure of Steel", by Prof. Wm. Campbell, New York City.

40—"Some Defects in Steel Castings and Remedies for Them", by John Howe Hall, New York.

41—"Reports of the Committee on Steel Foundry Standards", by Dudley Shoemaker, Chairman, American Steel Foundries, Indiana Harbor, Ind.

Thursday, Sept. 10, 2 p. m., Palm Room, Stock Yards Inn.

Individual Session, American Foundrymen's Association.

42—"Cast Iron with Unusual Structure", by K. W. Zimmerschied, Detroit.

43—"Iron and Its Properties", by Peter F. Blackwood, Detroit.

44—"Report on the Conservation Congress", by Paul Kreutzpointner, Altoona, Pa.

45—"Green Sand Cores", by James Mulvey, Troy, N. Y.

46—"Memorandum on the Preparation of Standard Specifications for Cast Iron for International Export Use", by Dr. Richard Moldenke.

47—"Semi-Steel", by R. H. Probert, Springfield, O.

48—"Tests of Cast Iron", by W. P. Putnam, Detroit.

49—"Material for High Grade Castings," by J. E. Johnson Jr., Detroit.

Thursday, Sept. 10, 7 p. m.

Annual Banquet, La Salle Hotel.
Ladies' Banquet, La Salle Hotel.

Friday, Sept. 11, 10 a. m., Palm Room, Stock Yards Inn.

Individual session, American Foundrymen's Association.
50—Reports of officers and special committees.
51—Unfinished business.
52—New business.
53—Election of officers.

Friday, Sept. 11, 12:30 p. m.

Sight-seeing tour of industrial Chicago, special train furnished by the Chicago Association of Commerce will leave the International Amphitheater at 12:30 P. M.

Foundry and Shop Exhibition

List of Exhibitors at Chicago and Details of Their Displays at the International Amphitheatre

ACME MACHINE TOOL CO., Cincinnati.—A motor-driven 3¼x 36-inch flat turret lathe with a geared head and provided with both bar and chucking equipment will be shown in operation; represented by J. R. Pearson and Joseph M. Herrman.

AJAX METAL CO., Philadelphia. — This exhibit will consist principally of non-ferrous ingot metals, babbitt metals and white metals, including bronzes of various kinds, brasses, bearing metals, etc.; represented by G. H. Clamer, H. L. Carpenter Jr., Frank M. Willeson, C. F. Hopkins and William J. Coane.

AMERICAN PULLEY CO., Philadelphia.—Steel split pulleys will be displayed.

ARCADE MFG. CO., Freeport, Ill.—The various types of molding machines manufactured by this company, will be exhibited, including jolt-ramming machines, Modern machines of the hand and air power types, hand and air power squeezers, combined jolters and squeezers, core jolting and piston molding machines, sand sifters, gray iron foundry pouring device and pattern plates of various types; represented by E. H. Morgan, Chas. Morgan, L. L. Munn, F. N. Perkins, August Christen, G. D. Wolfley, W. C. Norcross, R. E. Turnbull, and Henry Tscherning.

ARMSTRONG-BLUM MFG. CO., Chicago.—Hack saws.

ATKINS, E. C., & Co., Indianapolis.—A new line of metal-cutting saws.

AYER & LORD TIE CO., Chicago.—An extensive display will be made of "Interior" creosoted wood blocks, a sample pavement of which will be shown. In addition blocks will be exhibited that have been taken from floors in service various lengths of time, and similar blocks will be shown that have been removed from street pavement, etc. In addition, samples of creosoted timbers for building purposes, etc., will be exhibited; represented by A. H. Noyes, B. S. McConnell, Frank A. Weaver, James Adkins Jr., and E. L. Parvin.

BARBER-COLEMAN CO., Rockford, Ill.—Milling machines and milling cutters.

BATTLE CREEK SAND SIFTER CO., Battle Creek, Mich.—Sand sifters.

BENJAMIN ELECTRIC MFG. CO., Chicago.—Electric lighting fixtures.

BERKSHIRE MFG. CO., Cleveland.—The complete line of molding machines manufactured by this company, will be shown in operation. The exhibit will include machines of the following types: Automatic air squeezer, hand squeezer and core making machines, vibrators and other small equipment also will be shown; represented by R. H. York, W. A. Price, W. D. Fraser, F. Hulec and G. L. Cannon.

BESLY, CHAS. H., & CO., Chicago.—Surface grinders and grinding machinery.

BIRKENSTEIN, S. & Sons, Chicago.—This exhibit will consist of the following metals and alloys cast in various forms for convenient use in the brass foundry: Lake copper, tin, aluminum, antimony, lead, babbits, solders, brass and bronze ingots.

BLYSTONE MFG. CO., Cambridge Springs, Pa.—The core sand and facing mixer built by this company will be shown in operation. This machine will be exhibited both with and without the riddling attachment; represented by H. J. LeFevre.

BOND FOUNDRY & MACHINE CO., Manheim, Lancaster Co., Pa.—A complete line of power transmitting machinery will be shown. This exhibit will be in charge of the company's western agents, The Reeves Pulley Co., Chicago.

BROWN & SHARPE MFG. CO., Providence, R. I.—Plain grinding machine, universal and heavy plain milling machines, automatic screw machines, milling cutter, etc., will be shown. The plain grinding machine is new in design and has an interesting type of drive for the work table. The automatic screw machine is also new; it has a constant speed drive and can be belted direct to the main line without using a countershaft; represented by G. B. Bealle, F. B. Evans and R. E. Doras.

BROWN SPECIALTY MACHINERY CO., Chicago.—A complete line of core making machines will be shown, including three styles, equipped to make round cores from ⅜ to 3 inches, ½ to 5 inches and ⅝ to 7 inches. These machines also are designed to produce square, round, hexagon, and odd shaped cores within the capacity of the respective machines. Core-tapering and cutting-off machines as well as electric and pneumatic shakers also will be shown; represented by Elmer A. Rich Jr., Herbert T. Rich, John Laycock, and Robert Laycock.

BUCH FOUNDRY EQUIPMENT CO., Bridgeport, Pa.—A complete line of molding machines.

BUCKEYE PRODUCTS CO., Cincinnati.—A line of partings, core compounds, metal fluxes, high temperature furnace cements, air vibrators and metal melting furnaces manufactured by this company will be exhibited; represented by C. J. Goehringer, J. W. Mann, R. B. Ferguson, W. F. Panek and B. Bernbaum.

CARBORUNDUM CO., Niagara Falls, N. Y.—A complete line of carborundum and aloxite wheels for foundry work, carborundum and aloxite paper and cloth, carborundum rubbing bricks and carborundum and aloxite discs, will be exhibited; represented by G. R. Rayner, C. C. Schumaker, O. C. Dobson, J. H. Jackson, R. H. Kerwin and C. D. Bradbury.

CATARACT REFINING & MFG. CO., Buffalo.—Samples of liquid core compound, parting and a full line of cores made from the liquid core compound manufactured by this company will be displayed. In addition, cutting compounds, cutting oils and soluble oil also will be shown; represented by R. J. Collins, D. L. Baldwin, J. Purvis Jr., W. E. Williams, H. C. Newton, T. J. Kenefick and E. H. Coburn.

CENTRAL IRON WORKS, Quincy, Ill.—The space reserved by this company will be fitted up as a rest room for visiting foundrymen and literature showing this company's line of equipment including cinder and tumbling mills, dust arresters, core ovens, sand mixers and sand blast equipment, will be distributed; represented by F. M. Brown, Alfred Anderson, Chas. G. Howe and W. T. Lechtenberg.

CHICAGO PULLEY & SHAFTING CO., Chicago.—A ball bearing shaft hanger will be shown; represented by S. A. Ellicson and F. A. Mills.

CHICAGO PNEUMATIC TOOL CO., Chicago.—Air rammers and a complete line of pneumatic machinery.

CLARK, JAS., JR., ELECTRIC CO., Louisville.—A complete line of electrically-driven tools manufactured by this company including portable electric, sensitive, two and three-spindle radial and semi-radial drills, power hack saws, grinders of various types, motors and generators will be shown; represented by W. W. Crooker, James Clark Jr. and Chas. E. Willey.

CLARK, CHARLES J., Chicago.—Cupola blast meter.

CLEVELAND PNEUMATIC TOOL CO., Cleveland.—This exhibit will consist of a complete line of pneumatic tools for foundry use, consisting of riveting and chipping hammers, sand rammers for bench, core, floor and flask ramming, portable emery grinders, valve grinders, various types of air, corner, rotary and breast drills, as well as core breakers and couplings. All of the foundry tools will be shown in operation; represented by H. S. Covey, Arthur Scott, C. J. Albert and J. A. Day.

CLIPPER BELT LACER CO., Grand Rapids, Mich.—Steel belt lacing.

COBURN TROLLEY TRACK MFG. CO., Holyoke, Mass.—Two different styles of overhead mono-rail, especially adapted to foundry uses, will be displayed and motion pictures will be shown illustrating foundry mono-rails in operation; represented by W. D. Ballard.

CONSOLIDATED PRESS & TOOL CO., Chicago.—Presses and metal working machinery.

COWAN TRUCK CO., Holyoke, Mass.—Trucks for shop use.

CURTIS PNEUMATIC MACHINERY CO., St. Louis, Mo. — Overhead traveling crane, jib crane, overhead trolley system, Curtis foundry hoist, sand blasts and air compressors, all of which will be in operation, will be displayed. Also photographs of interesting foundry elevator and casting-breaker installations; represented by E. J. Clark and L. C. Blake.

DEMMLER, WILLIAM, & BROS., Kewanee, Ill.—Molding machines.

DIXON, JOSEPH, CRUCIBLE CO., Jersey City, N. J.—A non-skimming crucible, bottom pouring crucible, standard crucibles of various types, etc., will be displayed; represented by D. A. Johnson, W. B. Allen, H. C. Sorenson, F. R. Brandon and Frank Krug.

EDGEMONT MACHINE CO., Dayton, O.—Samples of the entire line of equipment manufactured by this company will be exhibited, including line shaft clutches, cut-off couplings, gas engine clutches and friction clutch countershafts; represented by George Stahl, W. P. Coffman and O. B. Coffman.

ELECTRIC CONTROLLER & MFG. CO., Cleveland.—Electric controlling devices, lifting magnets, etc.

ESSLEY, E. L., MACHINERY CO., Chicago.—This display of machine tool equipment will include the products of the following manufacturers: American Tool Works Co.,

Cincinnati, 14-inch x 6-foot, 20-inch x 10-foot, 36-inch x 14-foot high duty engine lathes; 15-inch and 24-inch high duty shapers; 2, 3 and 6-foot heavy duty plain radial drills and a 24 x 24-inch x 6-foot planers; represented by J. B. Doan, Robert S. Alter, J. C. Hussey and C. K. Cairns. The Cincinnati Pulley Machinery Co., Cincinnati, several styles of high speed ball bearing drill presses, from one to six spindles; represented by L. B. Patterson and J. G. Hey. The Diamond Machine Co., Providence, R. I., automatic surface grinder and a motor driven 84-inch guide bar grinder; represented by Messrs. Wight and Slepkow. International Machine Tool Co., Indianapolis, 26-inch turret lathe with 7½-inch hollow spindle; represented by O. B. Iles, C. L. Libby and F. B. Huston. Barnes Drill Co., Rockford, Ill., 20-inch heavy duty drill press; represented by B. F. Barnes and J. C. Andress. Colburn Machine Tool Co., Franklin, Pa., heavy duty high speed drill press and a 54-inch vertical boring mill, both motor driven; represented by H. L. Colburn and H. W. Breckenridge. Skinner Chuck Co., New Britain, Conn., a complete line of lathe and drill chucks; represented by E. J. Skinner. G. T. Eames Co., Kalamazoo, Mich., compound mandrel arbor presses; represented by J. H. Penniman. The Essley company will be represented by E. L. Essley, J. R. McDonald, H. F. Roberts, C. M. Robertson, Geo. Burki, J. J. Shanahan and E. P. Essley

FEDERAL FOUNDRY SUPPLY CO., Cleveland.—Molding machines and aluminum, interchangeable, adjustable snap flasks will be displayed; represented by W. J. Adams, R. Ditty, E. Kaye and C. Berger.

FELT & TARRANT MFG. CO., Chicago.—Demonstration will be made of this company's new controlled-key duplex Comptometer adding and calculating machine as applied to book work, billing, estimating, prorating, cost calculations, etc., with special reference to problems of accounting peculiar to the metal industry; represented by W. D. Lawrence.

FLEXIBLE STEEL LACING CO., Chicago.—Steel belt lacing will be shown and the speed with which a flexible joint may be produced with no other tool than a hammer, will be demonstrated. A standard testing machine to test the strength of the belting joint produced with flexible steel lacing, will be displayed; represented by G. E. Purple.

THE FOUNDRY.—Booth will be fitted up as a rest room for visiting foundrymen; represented by John A. Penton, A. O. Backert, H. Cole Estep, A. L. Klingeman, E. C. Kreutzberg, L. C. Pelott, A. W. Howland and George H. Manlove.

GARDEN CITY SAND CO., Chicago.—Various grades of molding sands fire brick, etc., will be shown.

GARDNER MACHINE CO., Beloit, Wis.—A complete line of grinding machines and accessories, as well as a line of ball bearing polishing lathes will be shown; represented by L. W. Thompson, F. E. Gardner, E. B. Gardner, W. B. Leishman, J. M. Gardner, E. L. Beisel, A. A. Swimmerton and W. L. Townsend.

GENERAL ELECTRIC CO., Schenectady, N. Y.—Among the equipment to be shown by this company, will be an arc welding outfit of the portable type consisting of a 10½-kilowatt motor-generator set and panel mounted on a truck. The voltage impressed across the arc is varied automatically with the length of the arc. The polarities of the electrode and casting also are interchanged automatically when the function of the electrode is changed from heating the break in the casting with carbon to filling it with iron or vice versa. A centrifugal compressor with a capacity of 4,500 feet of free air per minute and driven by a 30-horsepower induction motor at 3,450 revolutions per minute, also will be exhibited. The General Electric Co. will loan to a number of exhibitors, motors for driving direct various machines used in foundry and machine shop practice. An interesting display will consist of a reversing motor-driven planer equipment. This method of planer drive has been tried out in service and some interesting records in the machining of castings have been made.

GISHOLT MACHINE CO., Madison, Wis.—An automatic vertical boring mill, tool grinder, turret lathe, small tools and an electro-mechanical time recording apparatus will be exhibited; represented by Chas. Spalding, E. A. Fuller, G. E. Gernon, J. E. Ruth, E. J. Bullard and Ellis F. Muther.

GOLDSCHMIDT THERMIT CO., New York.—Thermit cans for reviving dull iron in the ladle, making semi-steel, keeping risers liquid, etc., titanium-thermit cans for purifying iron and steel, increasing its fluidity, etc., specimen thermit welds of heavy sections including a weld of a 9¼-inch crank shaft and samples of vanadium, manganese, cobalt, chromium and other alloys will be shown; represented by H. S. Mann, H. G. Spilsbury, D. B. Browne, William Aldrich and C. D. Young.

GOULD & EBERHARDT, Newark, N. J.—Two machines will be shown in operation, including an 18 x 10-inch gear hobbing machine and a 28-inch shaper. The hobbing machine will be operated on spur gears and the shaper will plane high carbon steel.

GREAT WESTERN MANUFACTURING CO., Leavenworth, Kan.—Two styles of gyratory foundry riddles will be exhibited, one style equipped with horizontal electric motors, and the other with vertical electric motors; represented by F. A. Pickett and George W. Combs.

GREAT WESTERN SMELTING & REFINING CO., Chicago.—A display will be made of brass, bronze, German silver and other alloys in ingot form and babbit bearing metals, also solders of various compositions will be displayed. Die cast bearings and bushings and brass and bronze castings made from the ingot metal manufactured by this company also will be exhibited; represented by S. Spiro, I. N. Perlstein, A. L. Levy, Arthur Lewis, J. H. Collin and J. T. Cantor.

HANNA ENGINEERING WORKS, Chicago.—Various types of electric and pneumatic sand shakers, including the tripod, post and trough style will be shown. A feature of the pneumatic shaker that will be exhibited consists of a syphon lubricator designed for attaching to pneumatic machines of various kinds to insure uniform lubrication to all working parts through the live air ports; represented by A. F. Jensen, W. H. Huelster, J. T. Georgeson, David M. Whyte, Philetus W. Gates and James T. Lee.

HAYWARD Co., New York.—Electrically operated clam shell bucket of new design for handling foundry sand and other materials, orange peel buckets, drag scraper buckets, etc., will be exhibited; represented by H. S. Atkinson, H. M. Davison, C. S. Sargent and C. F. Hutchings.

HEALD MACHINE CO., Worcester, Mass.—A cylinder grinder, internal grinder, ring grinder, drill grinder and 16-inch rotary surface grinder will be displayed, together with a number of rotary and flat magnetic chucks which will be shown in conjunction with a special testing outfit to demonstrate their holding power; represented by J. N. Heald, C. N. Cowan, S. T. Massey and G. A. Pabst.

HENION & HUBBELL, Chicago.—A complete line of iron cement manufactured by the Smooth-On Mfg. Co., Jersey City, N. J., will be exhibited; represented by W. B. Henion, C. W. Hubbell, R. C. Mead, D. P. Toberty, W. J. Walther, W. P. Barclay and Vreeland Tompkins.

HERMAN PNEUMATIC MACHINE CO., Zelienople, Pa.—A complete line of molding machines manufactured by this company, will be shown in operation. These will include a 50 x 60-inch jar ramming machine with independent roll-over and pattern drawing device, 30 x 45 jar ramming stripping plate machine, 40 x 50-inch and 24 x 24-inch plain jar ramming machines, jar ramming machine with hand stripping device, jar ramming machines with roll-over and pattern drawing device and several small and medium size jar machines; represented by A. M. Frauenheim, Alfred Herman, M. L. Heyl, A. Rodgers, Robt. F. Ringle, A. McWithey and Joe Larson.

HILL-BRUNNER FOUNDRY SUPPLY CO., Cincinnati.—This company's space will be used as a rest room for visiting foundrymen, but in addition, a core box will be displayed and demonstrated; represented by John Hill, M. Z. Fox and C. H. Homer.

HILL & GRIFFITH CO., Cincinnati.—An extensive line of foundry supplies will be exhibited, including plumbago, core wash and core compound, parting compounds, chaplets, combination torch blacking sprayer and suction mold cleaner, as well as other foundry specialties; represented by J. M. Glass, D. T. Richards, William Oberhelman, F. McCarthy and J. H. Lyle.

HUNTER SAW & MACHINE CO., Pittsburgh.—Vanadium steel 36-inch hot saw, 44-inch high speed friction saw, Newton cold saw in operation equipped with 26-inch Hunter inserted tooth saw blade, inserted tooth grinder and saw sharpening machine, will be displayed.

IDEAL CONCRETE MACHINERY CO., Cincinnati.—Core sand mixing machines.

INTERNATIONAL ELECTRIC TOOL CO., Milwaukee.—Pneumatic vibrators.

INTERNATIONAL MOLDING MACHINE CO., Chicago.—A complete line of molding machines will be shown in operation, including a combination pneumatic and electric jar ramming machine, combination jar ramming turn-over draw machines, combination jar ramming power turn-over and power draft machines, power turn-over and power draft machines, stripping plate machines, stationary, portable power and combination jolt squeezers, as well as core ramming machines; represented by Edward A. Pridmore, W. W. Miller, D. C. Snow, J. W. Dopp, F. W. Hamel, E. M. Hays, and Carl Levahn.

INDEPENDENT PNEUMATIC TOOL CO., Chicago.—This exhibit will include piston type air drills, both reversible and non-reversible, equipped with roller bearings, Corliss valves, telescopic screw-feed, etc., portable air grinders in two sizes especially adapted for foundry use, pneumatic sand rammers, and new type of pneumatic chipping, calking and flue-beading hammers, close-corner drills, one-piece, long-stroke riveting hammers, extra small hammers for chipping and cleaning and a complete line of electric drills and grinders with direct-connected motors; represented by J. D. Hurley, H. F. Finney, H. H. Henricks, B. A. Durbin and F. J. Passino.

THE IRON TRADE REVIEW.—Booth will be fitted up as a rest room for visiting foundrymen; represented by John A. Penton, A. O. Backert, H. Cole Estep, A. L. Klingeman, E. C. Kreutzberg, L. C. Pelott, A. W. Howland and George H. Manlove.

JENNISON-WRIGHT CO., Toledo.—Creosoted wood block flooring.

JANESVILLE, WISCONSIN, MOULDING SAND CO., Janesville, Wis.—This exhibit will consist of four grades of molding sand

for use in iron, malleable and brass foundries; represented by J. F. Pember.

JOHNSON, C. W., Natick, Mass.—Molders' shoes.

KAWIN, CHAS. C., CO., Chicago.—This firm of foundry chemists and metallurgists will have a booth for the convenience of its friends; represented by Chas. C. Kawin, J. F. Nellis, Wm. J. Mulcahy, R. J. Courtney and J. H. Hopp.

KING, JULIUS, OPTICAL CO., Chicago.—Eye protectors and welding helmets will be exhibited; represented by J. T. Brayton and J. J. Duffy.

KNICKERBOCKER CO., Jackson, Mich.—Dust arrestors.

LANG, R. F., New York.—Die castings produced by hydraulic pressure will be displayed; represented by R. F. Lang.

LANDIS MACHINE CO., Waynesboro, Pa.—A complete line of bolt cutting, pipe and nipple threading machines will be exhibited, including a 1½-inch motor-driven bolt cutter, 2-inch belt-driven single bolt cutter, 2-inch and 4-inch stationary type pipe die heads and 1¼-inch automatic screw cutting die head; represented by Dorsey Thompson Jr., and Carl F. Meyer.

LA SALLE MACHINE & TOOL CO., La Salle, Ill.—A plain and surface grinder will be shown in connection with the exhibit of the Marshall & Huschart Machinery Co., Chicago; represented by F. W. Matthiessen Jr. and S. M. Trenary.

LUPTON'S, DAVID, SONS CO., Philadelphia.—A complete line of the products manufactured by this company including Pond continuous cash, sash operating devices, etc., will be shown; represented by Clarke P. Pond and Robert A. Sanborn.

McCORMICK, J. S., CO., Pittsburgh.—A sulky sand riddler, snap molder's bench, adjustable snap flask jacket and a general line of foundry supplies will be exhibited; represented by J. S. McCormick, T. E. Malone and S. R. Costley.

McLAIN'S SYSTEM, Milwaukee.—This exhibit will consist of semi-steel castings made by following McLain's system, including motorcycle, aeroplane and automobile cylinders, gears, pistons, locomotive and automobile piston rings, crossheads, pillow blocks, rocker arms, air cylinders, mold boards, plow points, crane wheels, ammonia castings, crusher jaws, dies, fire backs, propellers, pulleys, and castings for pumps, valves, machine tools, etc.; represented by David McLain, I. V. Scanlan, Harry McLain and C. W. Miller.

MACLEOD CO., Cincinnati.—Sand blast tumbling barrels, sand blast revolving table machines, portable sand blast and portable oil burners for skin drying molds and portable oxy-acetylene apparatus for welding and cutting will be exhibited; represented by Walter Macleod.

MANUFACTURERS' EQUIPMENT CO., Chicago.—Aero chucks, collapsible taps and special tools for brass and iron manufacture will be shown.

MIDLAND MACHINE CO., Detroit.—Molding machines.

MAKUTCHAN ROLLER BEARING CO., Chicago.—Roller bearings.

MARSHALL & HUSCHART MACHINERY CO., Chicago.—A large number of machine tool manufacturers will display their equipment in this exhibit. The Bullard Machine Tool Co. will show in operation a 24-inch vertical turret lathe with cutting lubricant system. The Cincinnati Bickford Tool Co. will exhibit new radial drills, as well as a vertical drilling machine with tapping attachment, positive feed, etc. The Cincinnati Milling Machine Co. will display a plain milling machine with power quick return to table, flooded lubrication of the cutter, a universal milling machine and a universal cutter grinder. E. O. Patridge will exhibit a line of grinding machines and improved emery wheel guards. Gould & Eberhardt will demonstrate a 28-inch shaper and an improved hobbing machine. The Monarch Machine Co. will show a new geared head lathe. The Rockford Drilling Machine Co. will have in operation a 4-spindle gang drill and a single spindle drill. Baker Bros., Toledo, will demonstrate a high speed drill. The Lodge & Shipley Machine Tool Co. will demonstrate a new lathe with multiple stops and new tool room lathes with relieving attachment. The Cincinnati Planer Co. will exhibit planers provided with electrical reverse and quick power traverse to the heads. The Greaves-Klusman Tool Co. will operate a geared head lathe which gives all the headstock speeds by the movement of one lever. The Acme Tool Co. will demonstrate a motor-driven 3 x 36-inch flat turret lathe. The Landis Machine Co., Waynesboro, Pa., will exhibit a 2-inch single belt-driven bolt cutter and a 1½-inch motor-driven machine. In addition, the Marshall & Huschart company will exhibit Rivett lathes and grinders and a number of Peerless drill presses, lathes, etc.

MONARCH ENGINEERING & MFG. CO., Baltimore.—An extensive line of tilting metal melting furnaces will be shown, including an oil fired furnace of the crucible type, gas fired furnace of the crucible type with combustion chamber, coke fired furnace of the crucible type equipped with shaker grate, iron pot aluminum furnace, oil or gas single chamber furnace and a reverberatory smelting and refining furnace. The stationary metal melting furnaces will include a pit drop bottom furnace of the oil fired crucible type with combustion chamber, solid bottom oil fired crucible furnace with combustion chamber, oil or gas bath tub type aluminum furnace, oil or gas babbitt melting furnace, oil or gas soft metal melting furnaces and a shaker grate coke furnace for air operation. The core ovens that will be shown, include the coke oil and gas fired drawer type, ovens equipped with overhead trolley; represented by J. J. Allen, M. W. Woodburn, J. H. Fowler and H. D. Harvey.

MONARCH MACHINE CO., Sidney, O.—In the space of the Marshall & Huschart Machinery Co., will be shown in operation a 14-inch x 6-foot standard lathe and a 16-inch x 8-foot, 8-speed all geared head motor driven lathe.

MOTT SAND BLAST MFG. CO., Chicago.—The sand blast equipment manufactured by this company will be shown in operation; represented by David Mayer, E. J. Rosenthal, H. D. Gates, and F. J. Foster.

MUMFORD MOLDING MACHINE CO., Chicago.—This company will exhibit electric cam jolt ramming machines, several sizes of pneumatic jolt rammers, one of which will have in combination a pattern drawing mechanism, various sizes of power squeezers and split pattern machines, as well as combination jolt and squeezing machines, vibrators, hand and blow valves, etc., also will be displayed; represented by E. H. Mumford, David H. Whyte, W. H. Huelster, A. F. Jensen, J. T. Georgeson, Philetus W. Gates and James T. Lee.

NATIONAL ENGINEERING CO., Chicago.—The foundry mixers manufactured by this company will be shown in operation; represented by P. L. Simpson.

NEWPORT SAND BANK CO., Newport, Ky.—A full line of molding sand for all classes of foundry work will be displayed.

NEWTON MACHINE TOOL WORKS, INC., Philadelphia.—A complete line of power-driven saws for cutting off heads, risers, etc. from steel castings will be shown; represented by H. W. Champion, William M. Graham and James L. Scanlon.

NORMA CO. OF AMERICA, New York.—Ball bearings.

NORTON CO., Worcester, Mass.—A 2-inch Norton grinding wheel stand of a new type, and 2¼-inch grinding wheel stands of the bench type will be shown in operation. The Norton Co. extends an invitation to all other exhibitors to use these machines for sharpening tools or for any other grinding purpose during the exhibition. In addition, the company will display a large number of alundum and crystolon wheels of types suitable for foundry work; represented by Carl F. Dietz, John W. Horne and William Jove.

OBERMAYER, S., CO., Chicago.—A complete line of foundry supplies will be shown, in addition to the following equipment: Core jarring machine, electric sand sifter, Todd rumbler, rosin grinder, power sprue cutter, core oven, ladle drier, ladles, core sand mixer, sand grinder and venting machine; represented by Theodore Kauffman, E. D. Frohman, S. T. Johnston, C. M. Barker, O. J. Peterson, J. E. Evans, W. M. Fitzpatrick, F. H. Dodge, J. J. McDevitt, O. C. Olson, A. N. Wallin C. H. Green, G. P. Peterson and J. Hoefling.

OLIVER MACHINERY CO., Grand Rapids, Mich.—Patterns illustrating the work which can be done on the Oliver universal wood milling machine will be displayed; represented by George F. Reinhard.

OSBORN MFG. CO., Cleveland.—Among the machines which will be exhibited by this concern are the following: A drop-plate flask stripper which strips directly from the flask, the pattern being mounted on plates; a drop-plate squeezer which is a combination of stripping-plate, drop-plate and squeezer type machines; a 20 x 26-inch direct-draw roll-over machine especially adapted for deep, dry sand cores and green sand drags; a 30 x 36-inch roll-over rock-down machine; a plain jolt machine with a 6-inch cylinder; a rock-over, drop-draft machine designed for taking flasks 18 x 30 inches; an Osborn roll-over machine 28 inches between trunnions; a direct-draw roll-over jolt machine and an air-operated squeezer designed to straddle a 56-inch sand pile; represented by H. R. Atwater, E. S. Carman, Paul E. Ryan, E. T. Doddridge, M. W. Zeman and F. D. Jacobs.

OXWELD ACETYLENE CO., Chicago.—Blowpipes for cutting and welding metals by the oxy-acetylene process, generators and other devices of similar character suitable for foundry use will be displayed; represented by R. R. Browning, C. K. Bryce and W. S. Hoyt.

PANGBORN CORPORATION, Hagerstown, Md.—None of the sand blast equipment manufactured by this company will be exhibited, although an extensive line of photographs will be displayed showing the sand blast equipment, sand separators, sand dryers, ventilating equipment, sand elevators, sand and dust conveyors, dust collecting equipment, moisture and oil separators, etc., manufactured by this company. In addition, drawings and illustrations will be shown of equipment covered by a $16,000 order recently placed with the Pangborn Corporation; represented by Thomas W. Pangborn, John C. Pangborn and William A. Rosenberger.

PAXSON, J. W., CO., Philadelphia.—Sand blast and sand sifting machinery, magnetic separators, molding sand and foundry supplies will be exhibited and a photographic display will be made of installations of foundry equipment, as well as the manufacturing facilities of the Paxson company; represented by H. M. Bougher, E. M. Taggart and I. F. Kremer.

PEERLESS PARTING CO., Ottawa, Ill.—Parting compound, white silica sand, various

grades of ground silica and tripoli, as well as other minerals; represented by C. A. Hupp.

PICKANDS, BROWN & CO., Chicago.—A space 40 feet long and 15 feet deep reserved by this company will contain a reproduction of the Panama canal built of Solvay coke, on the scale of one-half foot to the mile for length and 1 foot to 100 feet in height. On one bank of the canal will be shown a profile of the location as it existed when the French first commenced operations. The various sections of the canal will be plainly and clearly formed and the canal bed will be filled with water. A pocket map showing new trade routes through the Isthmus as compared with the old Straits of Magellan route will be distributed; represented by J. A. Galligan.

PREST-O-LITE CO., Indianapolis. — Two complete welding and cutting outfits, oxygen cylinders of 100 and 300 cubic foot capacity, welded metal parts, etc., will be displayed. An operator will be on hand to perform welding and cutting operations and to demonstrate the portability, convenience, economy and simplicity of oxy-acetylene cutting and welding apparatus; represented by W. H. Adkinson.

PRIDMORE, HENRY E., Chicago.—A complete line of molding machines will be shown in operation, including the following types: stripping plate, rock-over drop, power squeezer, plain electric-driven jar ramming, combination, electric jolt ramming rock-over drop, electric jolt stripping plate, power ramming stripping plate, hand squeeze stripping plate, combination electric jolt and power rock-over drop; represented by Mrs. E. M. Pridmore, H. A. Pridmore, D. F. Eagan, C. H. Ellis, A. V. Magnuson and T. J. Magnuson.

REEVES PULLEY CO., Chicago.—Variable speed transmission, wood split pulleys, commercial line shaft, ball and roller bearings and other various transmission appliances, will be displayed; represented by M. O. Reeves, G. L. Reeves, D. E. Lewellen, C. L. Irwin, W. A. Richards and A. E. Shibley.

RICHMOND STAY-BOLT DRILLING MACHINE MFG. CO., Richmond, Va.—A Richmond 12-spindle semi-automatic stay-bolt drilling machine will be shown in operation. This machine, it is said, drills 2,500 bolts in 10 hours; represented by Anson W. Richards.

RIVETT LATHE & GRINDER CO., Boston, Mass.—Two bench lathes and one radial grinder will be shown. This exhibit will be in the space of the Marshall & Huschart Machinery Co.

ROBESON PROCESS CO., Pennington, N. J.—"Glutrin" will be exhibited and the booth of this company also will be fitted up as a rest room for the convenience of visiting foundrymen; represented by D. S. Robeson, W. E. Baird and F. J. Ryan.

ROCKFORD DRILLING MACHINE CO., Rockford, Ill.—This exhibit will include a four spindle 14-inch manufacturers' gang drill, a 23-inch Star lever heavy duty type upright drilling machine, and a 14-inch upright tapping machine.

ROGERS, BROWN & CO., Cincinnati.—This exhibit will consist of pig iron, coke ferro-manganese, fluor spar and castings made from the company's product, which include 65 different brands of pig iron; represented by E. L. Billingslea, L. C. Armour and H. B. B. Yergason.

S. F. K. BALL BEARING CO., New York.—A ball bearing hanger frame carrying shaft hangers, post hangers, rigid pillowblocks, pedestal pillowblocks, etc., will be shown in operation driven by a 1/10-horsepower motor. This exhibit will be arranged so that the shaft may be bent, by means of a system of levers, without binding the self-aligning bearings; represented by Messrs. Castino, Dunning and Farr.

SAND MIXING MACHINE CO., New York. — Two types of self-propelled sand-cutting machines, electrically driven, will be shown in operation. These machines are employed for cutting molding sand, and also are used in many shops for mixing core and facing sands; represented by V. E. Minich, William A. Heartt, Hutton H. Haley, John Bradley and Charles L. Benham.

SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y. — This exhibit will consist of the following equipment: A cage controlled electric traveling hoist, monorail type; a 5-ton electric traveling crane trolley; a high lift type direct current hoist of one ton capacity, an alternating current I-beam hoist of one ton capacity, a back geared motor with winch head attached, as well as gearing which enters into the construction of these machines; represented by F. A. Hatch, R. H. McGreedy, W. B. Briggs and N. Prakken.

SKINNER CHUCK CO., New Britain, Conn.—The exhibit to be made by this company will include a complete line of lathe, drill and planer chucks, drill press vises, face plate jaws, center arbors for drill chucks, universal and combination chucks, geared scroll chucks; represented by H. G. Hancock.

SLY, W. W., MFG. CO., Cleveland.—A full line of casting cleaning machinery will be shown, including tumbling mills, sand blast equipment, cinder mills, dust arresters, etc.

STEVENS, FREDERIC B., Detroit. — Samples of facing mill products, buffing compositions and a model Stevens warehouse will be shown. The booth will be fitted up for the reception of visitors; represented by Frederic B. Stevens, W. J. Cluff, J. F. Hughes, J. M. Johnston, A. T. Wagner, J. M. Mayers, D. D. Baxter, Ward H. Dean, Harry T. Taylor and L. C. O. Smith.

STERLING WHEELBARROW CO., West Allis, Wis.—A complete line of rolled steel flasks, wheelbarrows, trucks and other foundry equipment will be displayed; represented by I. R. Smith, H. H. Baker, E. W. Sample, J. M. Dickson and J. J. Coyne.

SUPERIOR OXYGEN CO., Pittsburgh.—An oxy-acetylene outfit will be shown.

SULLIVAN MACHINERY CO., Chicago.—This exhibit will consist of three air compressors, as follows: One compound belt-driven 2-stage machine, which will be operated and will supply air at 80 pounds pressure for the use of other exhibitors. The rated capacity of this machine is 628 cubic feet of free air per minute and it will be operated by a belt from a 100-horsepower General Electric motor. The second machine will be of the straight line single stage steam driven type and the third will be a belt-driven enclosed single stage type with automatic splash lubrication and unloading device. Photographs of the foundry operated by the Sullivan Machinery Co., at Claremont, N. H., and air compressors will be shown; represented by Howard T. Walsh, William P. J. Dinsmoor, Edward T. Almy, J. C. West, F. R. Alger, F. H. Hoge, H. M. Boice and S. B. King.

TABOR MFG. CO., Philadelphia.—An 8-inch power squeezer, a 10-inch power squeezer, a 10-inch jarring squeezer, an 18-inch roll-over machine, a 14 x 16-inch power squeezing split-pattern machine, a 3-inch jarring machine and a 4-inch jarring machine will be exhibited; represented by Wilfred Lewis, H. K. Hathaway, H. W. Brown, J. T. Ramsden, J. H. Coleman, G. B. Hastings, Dudley Wilcox, H. W. Impey, D. J. Martin and John Fender.

TITANIUM ALLOY MFG. CO., Niagara Falls, N. Y.—Ferro-titanium will be displayed and samples of iron and steel products made by the use of this alloy will be shown.

UNITED STATES ELECTRICAL TOOL CO., Cincinnati.—A complete line of portable electric tools will be shown in operation; represented by the Schneider Sales Co.

UNITED STATES GRAPHITE CO., Saginaw, Mich.—Graphite products for foundry use.

VANADIUM STEEL CO., Pittsburgh.—Ferro-vanadium and vanadium steel products will be displayed.

VROOMAN, H. S., Chicago.—A sand screen of an unusual type will be shown operated by a ¼-horsepower direct or alternating current motor. The machine is equipped with four sets of heavy steel wire metal bound screens of different mesh. The machine is portable and can be converted from a screening to a separating plant; represented by H. S. Vrooman and H. S. Vrooman Jr.

VULCAN ENGINEERING SALES CO., Chicago.—The products of the Q. M. S. Co. and the Hanna Engineering Works will be exhibited, including a cold metal cut-off sawing machine, air hoists and trolleys, pneumatic sand shakers, etc.; represented by J. T. Georgeson, W. H. Huelster, David M. Whyte, A. F. Jensen, Philetus W. Gates and James T. Lee.

WALLACE, J. D., Chicago.—The Wallace bench planer will be shown; represented by J. D. Wallace and Clifford Landis.

WARNER & SWASEY CO., Cleveland.—This machine tool exhibit will be shown in operation and will include a universal turret screw machine, a universal hollow hexagon turret lathe and an 18-inch brass turret lathe. The universal turret screw machine is equipped with power longitudinal feet for the carriage. The feeds for carriage and turret are independent, thus making it possible to use any feed that is best adapted for either member; represented by A. C. Cook, H. E. William, E. C. Neubert and Leonard K. Goss.

WERNICKE-HATCHER PUMP CO., Grand Rapids, Mich.—A new rotary air compressor of the single stage type with a displacement of 100 cubic feet per minute direct connected to a high speed electric motor and provided with automatic electric control, will be shown in operation, pumping air to pressures up to 100 pounds per square inch; represented by Wm. A. Hatcher, W. R. Harvey, N. M. Abernathy, J. F. Wernicke and L. C. Rahn.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh.—A complete arc welding outfit will be shown in operation and its application for welding various metals will be demonstrated. In addition, a number of electric motors adapted for various industrial applications also will be exhibited.

WHITING FOUNDRY & EQUIPMENT CO., Harvey, Ill.—The operating exhibit to be made by this company will consist of a 5-ton, 2-motor electric crane trolley mounted on a structural steel frame, and other equipment to be shown will consist of a 30 x 48-inch spur geared tumbling barrel, and section of a standard drawer type core oven and a flat top turnable 72 inches in diameter. In addition, photographs will be displayed of various kinds of cranes and equipment, as well as drawings of typical foundry layouts, etc.; represented by C. A. Hardy, R. H. Bourne, P. A. Dratz and R. E. Prussing.

WILLARD MACHINE & TOOL CO., Cincinnati.—Machine tools.

WILMARTH & MORMAN CO., Grand Rapids, Mich.—A motor-driven wet surface grinding machine, a motor-driven universal cutter, reamer and tool grinder, a combination cutter, reamer and drill grinder and two plain drill grinders will be exhibited in operation. The universal cutter, reamer and tool grinder is a new machine. A combination wet tool and drill grinder and several styles of plain drill grinding machines arranged for belt driv

also will be shown; represented by S. Owen Livingston, E. T. Gorham and H. L. Saunders.

WOODISON, E. J., CO., Detroit.—A general line of foundry supplies, facings, etc., will be shown as well as the "Galvarin" riddle with adjustable bottoms and all steel vibrators; represented by E. J. Woodison.

WYOMING SHOVEL WORKS, Wyoming, Pa.—This exhibit will consist of all styles and patterns of shovels, particularly those adapted for foundry use. Shovels manufactured from Mayari steel will be exhibited for the first time. The blade of this shovel is made from nickel-chrome steel, especially rolled for the Wyoming Shovel Works. Also a special handle will be exhibited, known by the trade name of Dirago. The grip is a malleable casting to which the handle is attached by means of a bolt extending through the entire casting and riveted on either side. In addition, the two sides of the handle are firmly seated in the casting, thereby insuring firm construction. The handle is well adapted for ramming and is designed particularly for convenience in shoveling; represented by G. E. Geer.

WOOD'S T. B., SONS CO., Chambersburg, Pa.—This exhibit will consist of an automatic adjustable snap mold jacket snap flask and an automatic equalizing snap rest; represented by C. O. Wood, W. H. Fisher, George M. Naylor and Victor Lesher.

Other exhibitors include Alexander Bros., Philadelphia; J. S. McChesney & Co., Chicago; Rock Island Mfg. Co., Rock Island Ill.; Alfred H. Schutte, New York; R. P. Smith & Sons Co., Chicago; Weaver Mfg. Co., Springfield, Ill., and Frank Van Couwenbergh, Rockwood, Ill.

"Business as Usual" in Spite of War

Is England's Motto—Prices of Pig Iron and Finished Materials Advancing and Orders Are Plentiful for Many Products

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Aug. 21.

The iron and steel trades are going beyond the "business as usual" ideal, which so promptly has been adopted as the war motto. Yesterday's meeting of the iron trade in Birmingham was animated, and prices in the pig iron department were extremely buoyant. They were also rather irregular, owing to varying opinions as to the soundness of the improvement. For instance, Northamptonshire forge varied between 59s ($14.16) and 62s 6d ($15.30), but generally the market is firm, and many smelters decline to go beyond 200-ton lots. Coke prices are decidedly firmer.

Most Brands Higher

Most brands of pig iron have increased about 12s 6d ($3) per ton on bottom prices; but it is noteworthy that Cleveland iron continues much steadier. Yesterday's quotation for warrants was 52s 11d ($12.70), with 8d (16 cents) more for three months' transactions. Stocks are increasing regularly, and now stand at 90,000 tons. As usual, when marked bar prices advance, cold blast pig iron becomes dearer. The rise amounts to 5s ($1.20), making the selling figure £6 10s ($31.68). Ferro-manganese has been increased £1 ($4.88) per ton, and the shortage of this material is expected to be a difficulty. Some high prices for Staffordshire foundry pig iron are being demanded, and owing to the make being in very few hands, the market is well controlled. Hematite prices keep very firm, with an upward tendency.

The disappearance of German competition has strengthened further all finished departments. A meeting of steel bar makers on Thursday decided to advance bar prices 10s ($2.40) per ton, making the new figure £8 ($39.18) per ton. It is expected this rise shortly will be extended to angles. Wire is about £2 ($9.78) dearer than before the war. The makers are in great difficulties through the lack of wire rods, British steel works demanding prices which are considered prohibitive. The wire drawers have appealed to the board of trade to bring their influence to bear upon the steel makers, on the ground that the trade are taking undue advantage of the war and are therefore behaving unpatriotically. Although the government has struck out a new line in one or two directions, in the control of industry and prices, it is not thought it will go quite so far as to regulate steel prices.

Orders have become plentiful for finished iron, especially hoops, gas strip, bedstead strip and several kinds of best material. Some very good orders have been captured, which for years past have gone to Germany, and others are expected to follow. The withdrawal of German billets and bars has enormously strengthened the hands of steel makers, who yesterday quoted prices ranging from £5 15s ($28.16) to £6 ($29.48) for ordinary Bessemer billets, and were not at all keen on doing business.

It is understood large quantities of billets and bars are hung up at Antwerp and Hamburg, and some English buyers are inquiring whether the latter cannot be delivered, but they are not hopeful. The large addition to the number of tin plate mills in operation has greatly assisted the steel trade.

The most serious effect of the war is the stoppage of the supply of spelter, the price of which has increased from £21 ($103) to £35 ($171.42). The agents of the Admiralty have this week taken possession of all spelter lying at railway depots and canal wharves and it is understood they have paid £40 ($195.84) per ton. For the small quantities still in holder's hands £45 ($220.68) is being asked. The shortage is serious for the Birmingham metal trades, and will greatly militate against the efforts being made to capture a large share of the German business in none-ferrous metals.

The attack on German trade has been taken up with a great deal of zeal, and Sheffield in particular is looking to recover a large amount of business in steel for small tools such as pincers, hammers, chisels and the like.

Birmingham dealers anticipate the file trade which Germany has been doing, is more likely to fall into the hands of America, these files being popular with buyers all over the country.

One effect of the great rise in the price of spelter has been an advance in galvanized sheets which are quite £2 ($9.75) dearer, the price now being quoted is £14 ($68.56) per ton. Many makers will not take orders at any price, in view of the doubt as to their ability to obtain spelter. Some consumers are anxious for government assistance to open supplies of material said to exist in South Africa, which could be obtained if railways were laid to the ore supplies.

Tin Plate Improves

The tin plate trade has much improved. It is reported that 440 out of 580 tin plate mills have resumed operations and a revival is looked for in the near future. The trade is suffering a good deal from a cutting off of business with the near east, especially some Russian ports. The price of gas strip has been advanced another half sovereign, making the selling figure £7 10s ($36.72).

The J. S. McCormick Co., manufacturer of foundry facings and supplies, Twenty-fifth street and Smallman avenue, Pittsburgh, is building a two-story brick office building on Twenty-fifth street, a short distance from the present office building, which is owned by the Railway Steel Spring Co.

Business News from the Capital

Panama Canal Opening May Result in Reduction of All-Rail Rates—Boats Delayed Awaiting Action by President Wilson

THE opening of the Panama canal and the adoption of a rate of 30 cents per 100 pounds (and not 30 cents per ton, as erroneously stated in many reports), on finished iron and steel products from New York City to Pacific coast points, has paved the way to what promises to result in a sharp reduction in the all-rail rate from central western points to the Pacific coast. On Oct. 6, the Interstate Commerce Commission will hear a petition filed by traffic managers of most of the trans-continental railroad lines, asking for a flat rate of 50 cents per 100 pounds, from Chicago to the western coast. If the proposed rate is allowed, the present "postage-stamp" rate of 80 cents per 100 pounds from Chicago and eastern points to the coast, will disappear, and eastern Ohio and western Pennsylvania mills probably will be forced into rather unfavorable positions so far as building up Pacific coast trade is concerned.

Railroad carriers operating between Pittsburgh and Chicago, through an agreement of long standing, have been allowed 11.2 cents per 100 pounds on shipments to Pacific coast points; a decrease in that allowance would be strongly protested, it is clearly indicated by the railroads affected. The all-rail rate from Pittsburgh to the western coast will be 61.2 cents per 100 pounds, or $12.24 per net ton, if the proposed 50-cent rate from Chicago to the coast is granted, and if there is no change in the present allowance of 11.2 cents for the haul between Pittsburgh and Chicago. The proposed $12.24 rate is $3.76 a net ton less than the present all-rail rate of $16 per net ton from Pittsburgh to the coast. The proposed all-rail rate from Chicago to the coast, $10 per net ton, is $2.24 less than the proposed rate from Pittsburgh.

The recently established rate of 30 cents per 100 pounds from New York City to the Pacific coast via the canal, gives Pittsburgh a rate of 46 cents via the canal since the rate from that city to New York is 16 cents. Figuring in net tons, the rate from Pittsburgh to the western coast, via the canal, is $9.20, or $3.04 lower than the proposed all-rail rate. Thus it is seen that Pittsburgh mills probably will ship over the New York-canal route in competing against Chicago interests for Pacific coast trade, unless they are willing to absorb freight differentials.

As pointed out, the rail and water rate per 100 pounds from Pittsburgh to the Pacific coast is 46 cents; from Johnstown to the coast the rate is 44½ cents; from Steelton, 40 cents; from Coatesville, 39 cents, and from Bethlehem, 37½ cents. Eastern Pennsylvania mills enjoy rail and water rates to the Pacific coast slightly lower than that from Pittsburgh. A charge of about 2 cents per 100 pounds for insurance and dockage is made in addition to the regular charge provided by the canal rate.

Pittsburgh industrial interests, which have long since regarded the Pacific coast as "foreign" territory, probably will submit some interesting data at the hearing before the Interstate Commerce Commission, in an effort to increase what little trade they have enjoyed through the 80-cent "postage-stamp" rate and through the former rates obtained by shipping over either all-water or rail and water routes from New York.

Boats Held

New York, Sept. 2.—In a telegram sent to Congressman Mann a few days ago, President James A. Farrell, of the United States Steel Corporation, urging the early completion of the remedial measures proposed for restoring the American merchant marine, so that export freight may be moved without further delay. Mr. Farrell speaks of various vessels now loaded and held up in port through the uncertainty of the owners as to how to proceed until the government acts.

Mr. Farrell's message is as follows:

"One of our steamers loaded for Uruguay and Argentina and steamer Crofton Hall, loaded for Chile and Peru, in New York harbor, ready to sail. Steamer Ecutra ready for grain or cotton Atlantic coast or gulf. Steamer Santa Rosalia, Puget Sound, ready for wheat, steamers San Francisco, Buena Ventura, Ikara, Industry, Matoppe and several others available for transportation of American produce, and we are patiently awaiting issuance of proclamation in order to be in an intelligent position as to whether we can put these steamers under American flag immediately and operate them competitively with steamers in oversea trade under other flags.

"As our steamers are being held at various ports at very heavy expense would appreciate advices as to about when information will be available to enable us to determine what to do. Captain Dollar and other American owners of ships now under foreign flags are in same position.

"The provisions of law prescribing that the watch officers of vessels of the United States should be suspended for a period of at least three years and the provisions of law requiring survey, inspection and measurement by officers of the United States should also be suspended for the same period. Further, until the war risk insurance bill has passed the House and become effective, we would be without insurance in the event of a transfer."

When President Wilson started for New Hampshire on his short vacation, it was announced that he took with him all the documents relating to the shipping bill with a view to studying the question and deciding as to the details of the order to be issued by him suspending certain provisions of the Panama law. The war insurance bill has passed both branches of Congress, having been approved by the House since Mr. Farrell sent his telegram.

Would Like To Meet Manufacturers

P. Donald, representing the firm of Rownson, Drew & Clydesdale., Ltd., 225 Upper Thames street, London, E. C., Eng., agent for manufacturers in Belgium, Denmark, Germany and other foreign countries, is visiting Canada and the United States with a view to finding markets for goods in the iron trade which England has hitherto purchased from the continent. Among the products in which his firm is particularly interested are nails, gas and water tubes, cast iron pipe, cast iron bath tubs, strips, etc. Mr. Donald will be in Toronto until Sept. 7, and will visit cities of the United States at a later date. He writes THE IRON TRADE REVIEW that the Canadian government is arranging to have various manufacturers meet him in Toronto and that he will be pleased to make similar arrangements with the manufacturers in the states, so far as they are interested. His address until Sept. 7 will be the Canadian Manufacturers' Association, Toronto.

To Reorganize

Will be Effort of Receivers of Steam Pump Company

Efforts will be made at once to reorganize the affairs of the International Steam Pump Co., receivers for which were appointed by the Federal District Courts at New York City on Aug. 26, upon the application of several creditors. The receivers appointed are C. Philip Coleman, one of the vice presidents of the company, and Grayson M. P. Murphy. The receivership is a friendly one, and the company has filed an answer admitting the allegations of the petition. According to a statement by the directors, the receivership was brought about by the fact that "although the company has been doing a fairly prosperous business and has been earning considerably more than its interest charges, it will not be able to make the interest payment of about $235,000 and the sinking fund payment of $250,000 due Sept. 1 on its first lien, 20-year, five per cent bonds." It also lacks adequate working capital. The liabilities of the company are given as about $10,500,000, including $9,347,900 of five per cent bonds outstanding, current accounts, and $1,150,000 of collateral trust notes maturing on Oct. 2, which are amply secured by collateral. It is stated that the receivership of the International Steam Pump Co. is not expected to involve any of its associated or subsidiary companies.

The International Steam Pump Co. was organized under the laws of New Jersey in 1899, with a capital stock of $39,000,000, of which $11,350,000 of the preferred and $17,762,500 of the common stock, have been issued. The company at that time and later acquired either the entire or majority control of a number of different corporations, including the Blake & Knowles Steam Pump Works, East Cambridge, Mass.; the Deane Steam Pump Works, Holyoke, Mass.; the Henry R. Worthington Co., Harrison, N. J.; the Laidlaw-Dunn-Gordon Co., Cincinnati; the Snow Steam Pump Works, Buffalo; the Holly Mfg. Co., Buffalo, the Clayton Air Compressor Works, N. Y.; the Power & Mining Machinery Co., Cudahy, Wis.; the Fred M. Prescott Steam Pump Co., West Allis, Wis., and the Jeansville Iron Works Co., Hazelton, Pa.

The affairs of the company for some months past have been the source of considerable talk in trade and manufacturing circles. Dividends on the preferred stock have not been paid since May, 1913, although from two years after its organization up to that time, six per cent per annum was paid. In 1913, as high as four per cent was paid on the common. For months before the stock exchange closed, the shares of the company have been quoted at very low figures. The company suffered a severe loss in the death of Benjamin Guggenheim, its chairman and president, when the Titanic sank in 1912. William Guggenheim, at present, is chairman of the board and Leon P. Feustmann and Mr. Coleman, vice presidents.

Holders of large blocks of stock of the company have selected a committee to represent their interests during the receivership. This committee consists of L. L. Clarke, president of the American Exchange National Bank; Williard V. King, president of the Columbia Trust Co., and James B. Haggin of this city, Albert N. Parlin of Boston and Otto Marx of Birmingham, Ala.

Time Needed

To Open New Avenues of Trade for Canadians

Toronto, Sept. 1.—Frederic Nicolls, vice president of the Dominion Steel Corporation of Sydney, N. S., in reply to a question as to the probability of the Canadian steel plants being able to supply a portion of the British demand for iron and steel goods caused by the cessation of imports from Germany and Belgium, said, "I certainly think the big steel companies should benefit by this opening of the British market for a class of products in which we have hitherto been unable to meet the competition of the continental manufacturers. But of course this will not be felt immediately, as it necessarily takes some time to open up new avenues of trade. Among the articles which we ought to be able to export to Britain are pig iron, steel rails, wire nails and merchant bars. The Dominion Steel Corporation is making arrangement to meet Mr. Donald, the representative of the British importers on his arrival in Canada and enter into negotiations without delay."

Sir Donald Mann, vice president of the Canadian Northern Railway, states that in spite of financial difficulties the company intends to complete its transcontinental lines as quickly as possible. It has now 3,000 men at work in British Columbia and will keep them employed until rail-laying is finished. Grading is expected to be completed by the end of September and steel has been delivered or is in transit for all sections of the main line west of Yellowhead Pass. Much of the track work is completed on the section between Port Arthur and Toronto, which will shortly be ready for operation.

The Illinois Metal Co., Chicago, has increased its capital from $30,000 to $50,000.

New Record

For Iron Ore Production Made by United States Last Year

According to the statistics recently completed by Ernest F. Burchard, of the United States Geological Survey, the production and shipments of iron ore in the United States in 1913 exceeded those of any previous year. The iron ore mined in the United States in 1913 amounted to 61,980,437 long tons, compared with 55,150,147 tons mined in 1912, an increase of 6,830,290 tons, or 12.38 per cent. The iron ore shipped from the mines in the United States in 1913 amounted to 59,643,098 long tons, valued at $130,905,558, compared with 57,017,614 long tons, valued at $107,050,153, marketed in 1912, an increase in quantity of 2,625,484 tons, or 4.60 per cent and in value of $23,855,405, or 22.28 per cent.

The Survey does not indicate shipments of iron ore from the Lake Superior region, which are published annually by THE IRON TRADE REVIEW. It is evident that on the Mesabi a considerable tonnage was left in stock pile, as the ore mined last year on that range was 36,378,671 tons, while the shipments were 34,038,643. On the other ranges, shipments were nearly equal to the production, as, for example, on the Menominee the production was 4,997,246 tons and the shipments were 4,965,604 tons. The Gogebic production was 4,743,515 tons and the shipments 4,531,558 tons. The Marquette production was 3,977,808 tons and the shipments were 3,966,580. Details as to shipments were published in THE IRON TRADE REVIEW of March 12, 1914.

Values of Ore

The average price of ore per ton for the whole country in 1913 was $2.19, compared with $1.88 in 1912. These quantities of ore, both mined and marketed, include the iron ore used for fluxing other metallic ores at smelters in the middle and western states, but do not include the iron ore sold for the manufacture of paint. The iron ore marketed for paint in 1913 amounted to 16,950 long tons, valued at $44,851. The ore reported as sold for fluxing purposes other than in the manufacture of pig iron amounted to 62,842 long tons, valued at $235,588, in 1913, compared with 88,449 long tons valued at $244,315, in 1912. The domestic iron ore actually marketed for the manufacture of pig iron amounted in 1913 to 59,580,256 long tons, valued at $130,669,970, compared with 56,929,165 long tons, valued at $106,805,838, in 1912.

Problems of Capital and Labor

Importance of Establishing Responsibility of Organized Labor—Violence Committed by Strikers at Trenton, N. J.

Trenton, N. J., Sept. 1.—The strike of the 500 union machinists in this city has taken such a serious turn that many of the manufacturers have appealed to Governor Fielder to call out the New Jersey state militia to protect their employes.

Karl G. Roebling, Ferdinand W. Roebling Jr., of the John A. Roebling's Sons Co., and William T. White, president of the Mercer Automobile Co., called on the governor and urged him to have troops break up the attacks made upon the employes by the strikers. Later the governor had a conference with Sheriff Madden and Prosecutor Devlin. The county officials, who have sworn in deputies are unable to cope with the situation.

As a result of the strike, the Mercer Automobile Company has been compelled to close down its big plant on the outskirts of the city. Strikers attacked employes and stoned automobiles used to convey them to their respective homes. After threats of death were made, the officials appealed to the governor. The executive promised to call the militia, if conditions do not improve.

The DeLaval Steam Turbine Co. is furnishing food and shelter for its many employes to prevent them being attacked by mobs when they leave the plant.

Pertinent Suggestions

Walter Gordon Merritt, counsel for the American Anti-Boycott Association, has filed a statement in part as follows, with the Federal Industrial Commission:

1. The primary consideration at the present time, both for the benefit of labor unions and the protection of outsiders, is the responsibility of organized labor to organized society. The rights of those engaged in industry should be clearly and justly defined and adequate civil and criminal remedies should be available to protect those who are wronged and to punish the wrongdoer.

2. All labor agreements should be made enforcible by making a union liable for damages in case of violation and making it possible to file such agreements with a court of equity with power to enjoin all attempts to instigate, maintain or enforce strikes in violation thereof.

3. Strikes on public utilities should be absolutely forbidden, and the question of wages and hours determined by the same commissions which pass upon the reasonableness of rates.

4. The distinction between lawful and unlawful strikes must be developed and enforced. The strike is a dangerous weapon, inflicting vast losses, and among the laws of any modern civilized nation, no other combination so calculated and intended to inflict such injury is permitted.

5. Laws should be enacted providing that no strikes should be called except after a free and unrestrained ballot by the strikers in support thereof, and the method of taking the ballot should be prescribed.

6. The country at large and employers and employes in particular should be protected against an organized war of exclusion, to drive the non-union men, the open-shop employer, and open-shop products out of industry. Forcing all opportunities of employment in any industry under the domination and control of any one organization, either of capital or labor, is monopoly and despotism of a dangerous and hateful character.

7. As long as we maintain our governmental policy of free trade and competition, the labor unions must be subjected to the ban of our anti-trust laws for legal and economic reasons.

Will Work Only Four Days

Toronto, Aug. 31.—Beginning next week, the plant of the Canada Foundry Co. here will be run on a four-day a week basis with the object of spreading the work over as long a time as possible in view of the approaching winter. There is a serious shrinkage in the demand for the output of the company due to the tightness of the money market.

Accident Reports

Harrisburg, Pa., Sept. 1.—A series of conferences will be held this week at the State Department of Labor and Industry for the purpose of working out a plan for standardization of accident reports required from manufacturing establishments, railroads, quarries, mines and other operations, and national, state, manufacturers' and labor organizations will participate. For some time preliminary meetings have been held and ideas presented by governmental, labor, corporation and insurance experts.

During the week, a conference of Pennsylvania people will be held and it will be followed by a meeting at which officials will come from Washington to represent the national government and from other states to discuss the uniform provisions. The Public Service Commission and State Department of Mines are co-operating with the Department of Labor and Industry and it is expected that forms will be much simplified.

Studying Immigrants

Harrisburg, Sept. 1.—Steps are being taken at the State Department of Labor and Industry for a study of the immigrants who will come into Pennsylvania this fall and they will be followed up not only as to what lines of industry they take up, but as to their housing and living conditions and other details which will aid in the establishment in the future of state employment bureaus. Special attention is also to be given to the immigration that takes place in case there is a revival of industry in the state when the countries which ordinarily furnish the unskilled labor are at war. This is considered to be an excellent time to begin studies.

The state has been making an extensive study of employment bureaus in other states and has had the co-operation of the United States Bureau of Industrial Relations in its investigations. It is probable that a system of employment agencies will be worked out before many months.

Examining Employes

Employes of the United States Steel Corporation's subsidiary companies in the Pittsburgh district are being examined physically for the notation of defects. Examinations are being made in connection with the safety first movement of the Corporation. Men found to have physical ailments will be treated by physicians of the various companies.

Weeks & Weeks, mechanical and consulting engineers, 72 Trinity place, New York City, have arranged to manufacture and to sell certain lines of machinery. After Sept. 1, their offices will be located in the *Tribune* building, New York City.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

At New York, practical stagnation still grips the machinery market as a result of the upset financial conditions. There is very little buying of machine tools by the railroads or manufacturing users under present conditions and some inquiries that recently have been put out, have been deferred indefinitely. Such buying as was done the past week in the New York market, consisted chiefly of single tool transactions and there was a limited number of such orders. The railroad lists, including those of the Chesapeake & Ohio and the Seaboard Air Line, which have been before the trade, remain unacted upon and it is uncertain when anything will be done with them. Reports continue to be received by machinery dealers and manufacturers of the retrenchment policies being pursued by certain automobile builders and typewriter manufacturers, who ordinarily are liberal buyers. The Max Ams Machine Co., which is to build a new plant near Bridgeport, Conn., has been buying some machinery. Machinery builders and dealers continue to give close thought toward making the most of the broader opportunities for export that now have been presented, but in view of the unsettled financial conditions, they are uncertain as to the best manner in which to proceed. This especially applies to the South American market, where England and Germany have enjoyed most of the machinery trade, due to the fact that these countries have been financing most of the business enterprises there. Until the United States is able to establish proper banking facilities in South America, it is not believed that much business can be hoped for. Shipments of machinery abroad continue to be held up by the confused situation created by the war. Further cases of the holding up of machine tool shipments to Russia are noted this week and one large manufacturer, who has deliveries of cranes on the way to Japan, has been advised that nothing further can be done in that direction at present. Some crane manufacturers report a fair domestic business.

At Pittsburgh, the machine tool market continues inactive and builders and dealers do not expect to witness any change in the situation until general conditions become normal. Builders of clay-working machinery have experienced moderately improved demand as a result of the prostrate condition of European industries, but this is the only line of machine tools that has directly benefited from war raging in Europe. Shops in which heavy rolling mill equipment is made in this territory continue to operate at practically maximum capacity, but mostly on contracts placed some time ago.

Machine tool sellers in the Chicago district have not experienced any particular change in conditions recently and business is neither better nor poorer than has been the rule through the summer. One dealer expressed himself as being so used to the steam roller that he cannot be rolled any flatter. Whatever improvement was due after the railroad rate situation was cleared has been negatived by the uncertainties produced by the European war. No deals of consequence have been closed since the recent purchase by a northern Illinois forging concern of $10,000 worth of forging hammers. A concern in Council Bluffs recently bought a considerable equipment of punch presses for sheet metal work. This class of machinery is showing more activity than almost any other. Sales to concerns of this sort are frequent and the demand for output of such shops seems to be steady. Small makers of agricultural implements and specialties appear to be more active than the larger concerns in the same line and are buying a considerable total of new machinery, although it is received for the most part in orders for single tools. No indications are apparent of an increased demand from any direction and sellers are at sea whether the usual gain in business during September will develop.

In Cincinnati, machine tool business for August will be below that of any month since the first of the year. Manufacturers state that very few export orders have been received since the beginning of the European war, and that users in this country are showing no inclination to buy. Jobbing foundries in this city are running on the average of about 25 per cent of capacity. Makers of special machinery are fairly busy on old orders, but new contracts are scarce.

EASTERN STATES

MANCHESTER, N. H.—Stark Mills, cotton goods, will erect a power plant to contain seven 300-horsepower boilers.

NEW BEDFORD, MASS.—B. F. Smith Construction Co. will build Taunton-New Bedford Copper Co.'s 49 x 56-foot, brick addition, to be used as a refining plant.

NORTH ADAMS, MASS.—Work has been started on a power house for the Hoosac cotton mills, which is the first step to building an addition for which plans are already drawn; cost, about $1,000,000.

SALEM, MASS.—Douglas & Haynes, metal working concern, will erect a building on Bridge street.

SPRINGFIELD, MASS. — Ridgewood Mills have been incorporated; $15,000; by Leon Petit Jr., Lydia Steward, Maria Celina Petit.

WILLIMANSETT, MASS.—Holyoke Box & Lumber Co.'s buildings were destroyed by fire; loss about $25,000.

WORCESTER, MASS. — Worcester Felt Shoe Co. has been incorporated; $50,000; by Edward A. Robinson, C. Keith Pevear, Mary Frank Pevear.

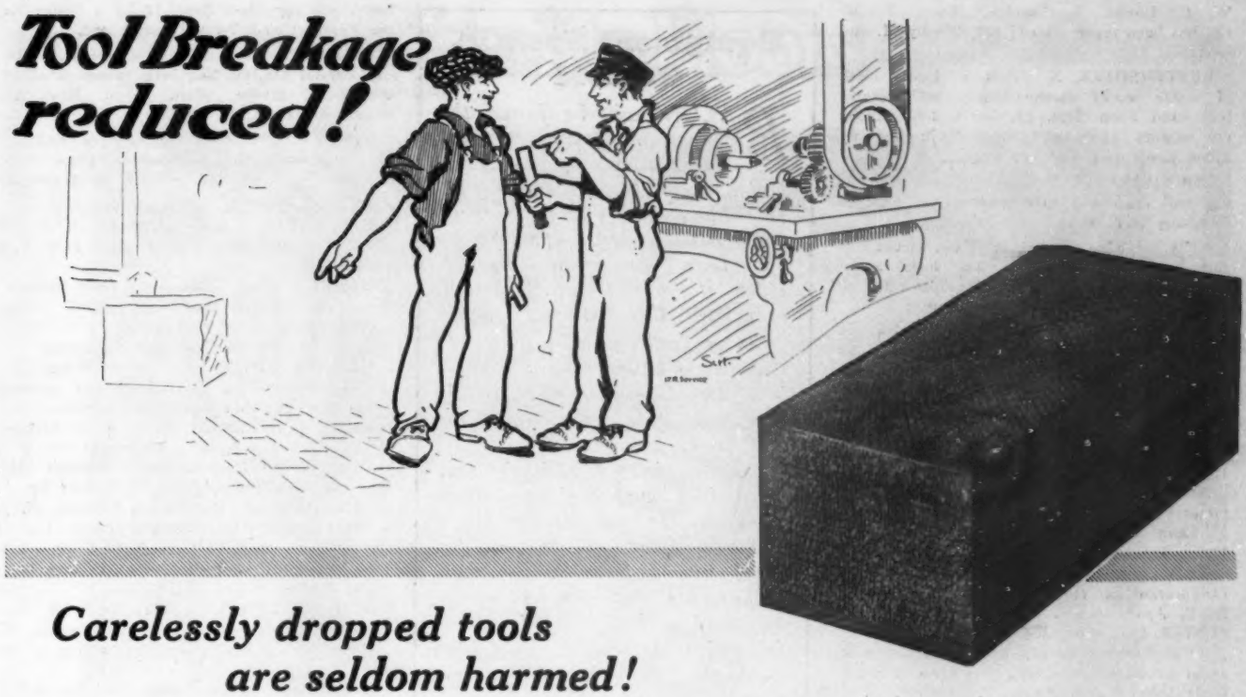
BRIDGEPORT, CONN.—Casey & Hurley have the general contract for the United Illuminating Co.'s $40,000, brick, steel and concrete addition to its plant.

TORRINGTON CONN. — Excelsior Needle Co. will build a 3-story brick addition to its plant for the manufacture of ball bearings; it will have 30,000 square feet of floor space.

BROOKLYN.—Pecker & Rokofsky, ornamental iron, has been incorporated; $5,000; by Joseph Lebowitz, 519 Rockaway avenue, Brooklyn; R. D. Monaghan, et al.

BUFFALO.—Newton Arms Co., maker of fire-arms, etc., has been incorporated; $10,000; by Charles Newton, Christopher H. Bierbaum, Dayton A. Evans.

BUFFALO.—Lunan Porcelain Enameling



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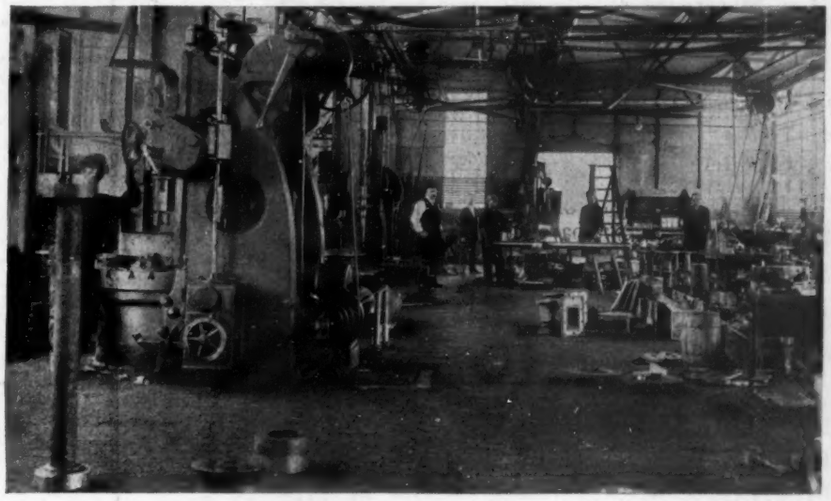

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PHILADELPHIA, PA. — 319 Perry Bldg.

W. C. Lunan, Southbridge, Mass., T. M. Co. has been incorporated; $20,000; by M. and Gretchen.

LESTERSHIRE, N. Y.—R. C. Lewis, clerk of water works commissioners, will receive bids until noon Sept. 14, for a 2,000-gallons per minute cross compound crank and fly wheel condensing pumping engine.

LOCKPORT, N. Y.—Covert Motor Vehicle Co. will erect a $50,000 addition as soon as switching facilities can be adjusted.

NEW YORK.—Charles H. Vass, mechanical and contracting engineer, has been incorporated; $50 000; by W. B. Lorenzo, E. and B. C. H. Vass, 2646 Morris avenue.

NEW YORK, N. Y.—Roechling Electric Steel Co. has been incorporated; $30 000; by M. Angden Hills, R. F. Conahan, Max Opp, 175 LaFayette street.

NEW YORK.—Cyrus Robinson & Co., machinists, civil engineers, have been incorporated; $200,000; by H. J. Chambers, J. W. Hamilton, C. Robinson, Mt. Vernon, N. Y.

NEW YORK.—U. S. Collapsible Steel Container Co. has been incorporated; $250,000; by P. Lenn, C. F. Hubbell, F. V. Winters, 539 Union avenue.

NEW YORK.—Northern New York Power Corporation has received its charter; $500,000; D. P. Ayars, G. H. Hess, William R. Hess, 27 West Twenty-fourth street.

NEW YORK.—American Synthite Co., maker of synthetic guns, etc., has been incorporated; $600,000; by Perley P. Sheehan, O. C. Sanborn, 276 Sterling street, Brooklyn, et al.

NEW YORK.—Continental Electric Welding Co. has been incorporated; $20,000; by H. L. J. Siemund, W. C. Steiger, H. Tessensohn, 29 Broadway.

NEW YORK.—Consolidated Engine Stop Co., electrical devices, tools, etc., has been incorporated; $120,000; by A. W. Brittan, T. S. Buckingham W. P. Powell, 37 Wall street.

NEW YORK.—Evolution Phone Co., electrical and mechanical devices, has been incorporated; $25,000; by T. F. Styles, Jamaica, N. Y.; H. G. Pape, I. B. Pape, 54 Bank street, New York.

NEW YORK.—Minto Safety Equipment Co., safety devices for elevators, has been incorporated; $10,000; by Grace M. Minton, James D. Abrams, Charles W. Abrams, 450 Riverside drive.

NEW YORK.—Kent Paper Co., maker of paper, has been incorporated; $120,000; by Ralph T. Willis, Plainfield, N. J.; Thos. Croly, 19 Irving Place, Brooklyn; Edwin M. Kent, 128 West Eleventh street.

NEW YORK.—Uneeda Tire Filer Co. of New York, manufacturer, has been incorporated; $100,000; by Max E. Rosenthal, Joseph Golden, 9 St. Marks street, Brooklyn; Thomas Bligh, 2306 Seventh avenue.

NYACK, N. Y.—R. E. King Shoe Mfg. Co. has been incorporated; $30,000; by R. E. King, Joseph L. King, Henry Koehler.

ROCHESTER, N. Y.—Finsen Electric Motor Mfg. Co. has been incorporated; $10,000; by Lillian Weyranch, R. Corydon Cash, Henry R. Howard.

SIDNEY, N. Y.—Jersey Silk Mfg. Co. has been incorporated; $25,000; by Wm. J. Wuerdaman, Vernon D. Stratton, Oxford, N. Y.; George A. Purdy, Oxford, N. Y.

WATERTOWN, N. Y.—City will erect a 3,000-horsepower plant on Black river.

WILLIAMSVILLE, N. Y.—Universal Bagger Mfg. Co. has been incorporated; $15,000; by C. E. Lavery, A. A. Klein, A. G. Beach.

ALLENTOWN, PA.—Rionor Silk Mill is erecting a $35,000, 3-story, 54 x 140-foot, brick and steel addition to its plant.

ALLENTOWN, PA. — Fuller Engineering Co. has the contract for about $1,000,000 to furnish the machinery and build a plant for the Dominion Portland Cement Co. at Whangarei, Auckland, New Zealand.

BUTLER, PA.—A. H. Star, clerk of the court, will open bids Sept. 12 for a bridge for the Prospect and West Liberty road.

ERIE, PA.—The Non-Condensing Boiler Co., capital $50,000, has been incorporated by Walter E. Moffet, Merit Owen, Erie; D. Brash, Ashtabula, O.

JOHNSTOWN, PA.—Pennsylvania Railroad Co. has asked for competitive plans from architects for the erection of a $1,000,000 depot in Johnstown.

KITTANNING, PA. — Citizens voted for $112,000 bonds for new electric light and water plant.

MERCER, PA. — Mercer county commissioners are asking bids on a steel bridge superstructure; county engineer, L. E. Burnside, Grove City, Pa., designed the bridge.

NEW BRIGHTON, PA.—State Water Supply Commission at Harrisburg has granted permission to the supervisor of Dougherty township, Beaver county, to build five bridges, three of which will be erected near this city.

PHILADELPHIA.—Universal Conduit Mfg. Co. has been incorporated; $300,000; by F. R. Hansell, G. H. B. Hansell, Camden, N. J.

PHILADELPHIA.—Eastern Lamp Co. is having plans prepared for a 1-story, 40 x 125-foot factory at Eighty-fourth street and Eastwick avenue.

PHILADELPHIA. — Wm. Steele & Sons Co. have the contract for the George W. Glabon Co.'s $90,000 factory building to be erected at Nicetown.

PHILADELPHIA.—Joseph Bird Co. and A. Whitehead are taking revised estimates upon the Fairmount Electric Mfg. Co.'s 2-story, 45 x 100-foot factory to be erected at Fifty-ninth street and Woodland avenue.

PITTSBURGH. — Pittsburgh Construction Co. has increased capital from $5,000 to $40,000; C. L. McKenzel, president.

PITTSBURGH.—American Metal Co., 522 Park building, maker of babbittless bronze castings, is in the market for a wet tumbling barrel for brass castings.

PITTSBURGH. — J. G. Chalfant, Allegheny county engineer, is preparing plans for a steel bridge to extend from Helen street, McKees Rocks to Preble and California streets, North Side; cost, about $2,000,000.

PITTSBURGH.—Pittsburgh Specialty Mfg. Co., malleable, cast iron and brass works, has been incorporated; $30,000; by E. J. Dugan, Jeanette, Pa.; B. J. Dugan, F. H. Kane, Greensburg, Pa.

PITTSBURGH. — Manufacturers Products Co., valves, etc., has been incorporated; $5,000; by Alfred J. Quiley, Oakmont, Pa.; J. W. Walters, Sewickley, Pa.; Lewis Schell Hart, Pa.

PITTSBURGH. — American Roller Bearing Co. has under construction a 1-story factory, which will more than triple the capacity of the present factory; it will be fitted with new machinery, part of which has been built for its particular need; it will be in most cases individual electric drive.

QUAKERTOWN, PA.—Landis Bros.' handle factory was damaged by fire; loss, $10,000.

TACONY, PA.—J. Richard Jackson has the contract for the Keystone Lantern Co.'s new factory.

WASHINGTON, PA.—Croxton Motor Car plant at this city has been sold to the Angldile Computing Scale Co., Elkhart, Ind., for $52,000; equipment will be moved to the local plant, and considerable new equipment will be installed.

WEHRUM, PA.—Lackawanna Coal & Coke Co. will rebuild the mine tipple and buildings destroyed a few weeks ago by fire; work is being handled at the office at Dunbar.

WHEELING, W. VA.—Wheeling Traction Co. will erect a new power plant to cost approximately $200,000; new equipment will be installed.

BUTLER, N. J.—George J. Fritz, clerk for municipal light plant, will receive bids until

Equipment News in Tabloid

BELOW will be found the most important new business items of the week boiled down for the busy reader. They are culled from a great mass of less important information for your benefit. Even if your time is limited, look over this list every week.

Chicago railroads will start construction of $50,000,000 Union depot Sept. 25. Laying of steel will be done first. Five years allowed for completion.

Pennsylvania Railroad Co. has asked for competitive plans from architects for the erection of a $1,000,000 depot in Johnstown, Pa.

The commissioner of purchases and supplies, Cleveland, will receive bids until noon Sept. 10 for a refrigeration plant for the dairy buildings at the colony farm, Warrensville, O.

Aluminum Specialty Co., Manitowoc, Wis., is having plans made for the erection of a $20,000 one and two-story, 60 x 200-foot factory building, to be constructed of steel and brick; the power plant will contain a 100-horsepower boiler and heat will be supplied by the vapor system.

International Canning Machinery Co., Owen, Wis., has been incorporated; $250,000; by E. J. Vaudreuil, W. C. Tufts, G. E. Anderson.

Stark Mills, Manchester, N. H., cotton goods, will erect a power plant to contain seven 300-horsepower boilers.

Excelsior Needle Co., Torrington, Conn., will erect a three-story, brick addition to its plant for the manufacture of ball bearings; it will have 30,000 square feet of floor space.

Fuller Engineering Co., Allentown, Pa., has a $1,000,000 contract to furnish the machinery and build a plant for the Dominion Portland Cement Co. at Whangarei, Auckland, New Zealand.

Rionor Silk Mill, Allentown, Pa., is erecting a $35,000, 3-story addition to its plant; it will be 54 x 140 feet and will be constructed of steel and brick.

Southern Wheel Co., St. Louis, will erect a $60,000 building of steel construction in Atlanta, Ga.; it will manufacture cast iron car wheels, with a daily capacity of about 300.

Kreolite Floors

Kreolite Wood Block floor in tube room Elyria Iron & Steel Co., Elyria, Ohio

Kreolite Wood Block floor declared a cost cutting investment

NOTE the men in the back-ground in the above view. They handle tons of metal daily over this Kreolite Block floor, yet there is practically no evidence of wear.

THESE men will tell you how easy this floor is on their feet, conducive to better work and more of it; a distinct increase in shop efficiency.

THIS Kreolite Block floor daily sees service that would shortly demolish the average plank, brick, or concrete floor, yet it is as smooth and compact as when first laid.

THE average Kreolite Block floor receiving hard wear has less than a 4% annual depreciation, a maintenance expense varying from ¼ to 1½%. What other flooring will give similar results?

Are you interested in labor saving and cost cutting factory installations? A line today will bring interesting information.

THE JENNISON-WRIGHT COMPANY
309 HURON STREET **TOLEDO, OHIO**

8 p. m., Sept. 14, for the construction of a power plant.

CAMDEN, N. J.—Cumberland Specialty & Mfg. Co. has been incorporateed; $25,000; by William H. Sandmann, S. Donelson, A. M. Garison.

CLOSTER, N. J.—Tally-Ho Water Co. has been incorporated; $300,000; by Harvey W. Remington, John F. Rillack, Edward A. Gosselin.

HOPEWELL, N. J.—City voted Aug. 4 for $10,000 bonds for improving water works.

JERSEY CITY, N. J.—Hamilton Mfg. Co. plans to erect a $100,000 factory building in this city for the manufacture of wood type.

JERSEY CITY, N. J. — United States Service corporation has received its charter to make electrical appliances; $10,000; John R. Turner, H. A. Black, C. H. Jarvis, incorporators.

TRENTON, N. J.—Power & Efficiency Co., spark plugs for gasoline engines, has been incorporated; $100,300; by M. T. Minogue, Philadelphia, Pa.; E. F. Hooper, H. T. Chullet.

CENTRAL STATES

AKRON, O.—Mohawk Rubber Co. has a permit for a $15,000 factory addition to be erected at Second avenue and River street; another building of similar design will be constructed, each to be 61 x 100 feet, 2 stories and of brick, steel and wood; W. A. Kranklin, contractor.

ASHLAND, O.—H. R. McGuire, clerk of county commissioners, will open bids Sept. 5, for the replacement of bridges, including the Bronnell bridge, consisting of a 40-foot solid riveted truss, 14-foot roadway.

BEREA, O.—Foundry of the Dunham Co., lawn rollers and machinery, was damaged by fire; loss, $25,000.

CANTON, O.—Canton Construction Co. has been incorporated; $10,000; by John P. Jones, Joe Perry, Harry Nusbaum, Hazel Smith, Mary Anne Jones.

CINCINNATI.—Cincinnati, Indiana & Louisville Railway Co. has begun the survey for a new road, which will connect this city with towns of southern Indiana.

CINCINNATI. — Union Saving Bank & Trust Co. will enclose all elevator shafts and stairways in its 18-story office building, thus making the structure more fireproof; estimated cost, $40,000.

CLEVELAND.—Prince-Wolf Co., cloak and suit maker, is soon to build a $75,000, 70 x 150-foot plant on East Twenty-first street.

CLEVELAND. — Brophy Engineering Co. has been incorporated; $10,000; by Grover H. Hull, B. E. Robertson, M. C. Egan, L. B. Shuers, L. M. Henders.

CLEVELAND. — McAdams Mfg. Co. has been incorporated; $50,000; by Marie A. Knight, Helen J. Rice, V. E. McCarthy, C. McElroy, Gertrude A. Hoynes.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until 12 noon, Sept. 23 for three vertical triple expansion crank and fly-wheel pumping engines.

CLEVELAND.—Continental Gas & Electric corporation has purchased the Nebraska Gas & Electric Co. and the Iowa Gas & Electric Co. for $1,250,000; $250,000 will be spent on improvements.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, Sept. 10, for a refrigeration plant for the dairy buildings at the colony farm, Warrensville, O.

CLEVELAND. — General Specialty Co., manufacturing mechanical specialties, has been incorporated; $20,000; by Albert E. Hinckley, John B. Earl, William H. Somers, Ida R. Hinckley, William Wainwright.

CLEVELAND. — County Engineer W. A. Stinchcomb has estimated the cost of a third high level bridge across the Cuyahoga river at $3,700,000; a resolution, to be submitted to the board of elections so that this improvement may be voted upon at the November election, has been prepared.

CLYDE, O.—County commissioners will issue $25,000 bonds for a bridge over the Sandusky river at Tindalls.

COLUMBUS, O.—Automatic Reclosing Circuit Breaker Co. has increased its capital from $15,000 to $40,000.

DAYTON, O.—Stievens High School is in the market for a small amount of equipment for its foundry and machine shop.

ELYRIA, O.—Columbia Steel Co. has a permit for an $8,500, brick and steel addition to its plant.

HAMILTON, O.—Cullen & Vaughn have the contract for the Beckett Paper Co.'s $15,000 addition to its plant; work will start at once.

HAMILTON, O.—Central Motor Co. is in the market for a small amount of light equipment, which will fit up an automobile repair shop.

JACKSON, O.—Star Furnace Co. has increased its preferred stock from $60,000 to $160,000.

KENT, O.—Kent Steel Post Co. was destroyed by fire.

LIMA, O.—Stolzenbach Baking Co. will erect a $75,000, 3-story, 50 x 50-foot addition to its plant.

NORWOOD, O.—John McAlfrick, architect, Boston, has plans prepared for a $150,000 theater, which will require about 100 tons of steel.

NORWOOD, O. — Dalton Adding Machine Co. will buy a small amount of additional equipment for its new factory; most of the equipment has been purchased.

SIDNEY, O.—Sidney Electric Co., electricity for light, heat and power, has been incorporated; $10,000; by Charles F. Chapman, Edward W. Kelsey Jr., H. W. Isenberg, B. Boggs, M. E. Nye.

TOLEDO, O.—Willys-Overland Co. has increased its capital from $25,300,000 to $30,000,000.

TOLEDO, O.—Toledo Ford Tire Co. will incorporate to manufacture tires for the Ford automobile; it will build a 60 x 250-foot, brick and steel factory.

YOUNGSTOWN, O.—A 1,100-foot bridge will probably be built across the new reservoir which will be completed about Dec. 1.

YOUNGSTOWN, O.—A municipal waterworks requiring a 75,000,000-gallon flow, will likely be constructed in connection with the municipal dam to be completed about Dec. 1.

ZANESVILLE, O.—Local business men are planning to organize a company to engage in the wholesale manufacture of electric power for the use of local manufacturers.

BECKLEY, W. VA.—Beckley Utilities Co., supplying water and power, has been incorporated; $100,000; by G. C. Hedrick, E. L. Ellison, W. W. Wilkes and Theodore Swann and J. E. Brown, both of Charlestown, W. Va.

CHARLESTOWN, W. VA.—O. M. Phillips Lumber & Supply Co., lumber manufacturer, has been incorporated; $10,000; by Oscar K. Phillips, L. Phillips, Pauline Phillips, et al.

BURKESVILLE, KY. — H. G. Greenup plans to equip an ice factory in connection with an electric light plant which he is now completing.

COVINGTON, KY. — Fire badly damaged the plant of the Cincinnati Locomotive & Car Works.

IRVINE, KY.—Clyde Gaines is planning to purchase a franchise and establish an electric light plant in this city soon.

LEXINGTON, KY. — American Metallic Packing Co. will buy a second-hand 10-horsepower gasoline engine of the portable type.

LOUISVILLE, KY.—Fire at the O. K. Stove & Range Co.'s plant did $1,000 damage.

LOUISVILLE, KY.—J. V. Pilcher Mfg. Co. will need several power crank drills of special design; specifications will be furnished on application to J. V. Pilcher, president.

LOUISVILLE, KY.—Louisville Bridge & Iron Co. will be in the market soon for alternating current motors to replace the direct current equipment now in use; address F. H. Vaughn.

WHITESBURG, KY.—K. U. Surman, Louisville, is organizing a company to build an electric light plant in this city, and proposes to begin work next month.

FT. WAYNE, IND.—Troy Laundry Co. has been incorporated; $75,000; by F. L. Jones, A. E. Sunier, Frank R. Dulin.

TELL CITY, IND.—Obrecht Bros. will enlarge their hub and lawn swing factory, and will need a considerable amount of woodworking machinery.

UNION CITY, IND.—Union City Telephone Co. has increased its capital from $50,000 to $145,000.

VALPARAISO, IND.—Maxwell Implement Co., farm implements, has been incorporated; $40,000; by Charles W. Benton, George L. Maxwell, S. Bert Hodsdon.

WINAMAC, IND.—W. E. Munschenburg, county auditor, will receive bids until 2 p. m., Sept. 8, for four bridges.

CHICAGO.—Louis A. Seeberger, acting for the Commonwealth Edison Co., has purchased a 24-acre tract at 130th street and Avenue N; land will be used eventually for a generating plant.

CHICAGO.—The Ideal Automobile Co. has been incorporated to manufacture and deal in machinery, automobile parts and accessories; $1,000, by Archy A. Gross, S. Abrahamson, Arthur C. Dunning and Leonard C. Cowan, 10 South LaSalle street.

CHICAGO.—The Boller Insulated Wire Co. has been incorporated to manufacture and deal in motors, electric appliances, wire and machinery; $20,000; by Peter Boller, Wm. N. Boller, W. H. Bentley, 124 North Curtis street. This corporation takes over the plant of a bankrupt concern and establishes it on a firm financial basis.

CHICAGO.—The Pettibone, Mulliken Co., North Cicero and West Division streets, is taking bids on a foundry, pattern storage and pattern shop. Construction will be of reinforced concrete, steel and brick. The foundry will be 50 feet high, 300 x 500 feet, the pattern shop, 100 x 200 feet and the pattern vault, 100 x 120 feet. New cranes will be installed and the company is considering the advisability of adding an electric furnace. Other new equipment will be required.

DUNNING.—W. N. Allen & Co., Peoria, has the general contract for an administration building of brick and steel, three stories and basement, 43 x 163 feet and a wing 26 x 42.

LELAND, ILL.—City will vote Aug. 28 on $7,000 bonds to construct a water works.

PLANO, ILL.—Illinois Metals Co. has increased its capital from $20,000 to $30,000.

RED BUD, ILL. — Citizens will vote Sept. 8 on $15,000 waterworks bonds.

ROCKTON, ILL.—Universal Wheel Co. has purchased a 60 x 100-foot lot and will erect a temporary 2-story, fireproof building to be used until the 5-acre plant is built.

WATERTOWN, ILL.—James B. Dibelka, 29 South LaSalle street, state architect, has plans for a building at the Watertown asylum, of brick and steel, three stories, 40 x 132 feet and a one-story wing, 28 x 34 feet. J. H. Stoolman of Champaign, has the general contract.

BATTLE CREEK, MICH.—Local capitalists plan a $50,000 corporation to make a steel railway tie, patented by Dewitt C. Meyers.

DETROIT. — Detroit Insulated Wire Co. will erect a $6,000, 1-story 57 x 138-foot addition to its plant.

Established 60 Years

THOMAS
1854 PIG IRONS 1914
THOMAS

Experience — Service — Reputation — Quality

Unequaled Results!

"Thomas Vanadium" is the ONLY iron on the market that contains large known quantities of VANADIUM. That is the reason it produces *unequaled results* — the reason it *assures perfection.*

Its exceptional *strength* and *toughness* will allow you to make castings of a texture and quality that you never before thought possible.

"THOMAS VANADIUM"

Fracture of Specimen

is the iron for the man who wishes to build up an enviable reputation.

Its closeness of grain makes it invaluable for strength.

Its softness permits it to be readily threaded and machined.

If you are a striver after QUALITY, try "Thomas Vanadium".

	In pig	In castings
Silicon	1.90	1.692
Sulphur	0.04	0.036
Phosphorus	0.688	0.752
Manganere	0.94	0.837
Ti.	0.209	0.141
Vanadium	0.046	0.046
Carbon	3.52	3.46

To the left we show the result of a test of our *No. 2 Plain* "Thomas Vanadium", made by Prof. Edwin O. Fitch, Jr., of Lafayette College.

The iron was made from a mixture containing 49 per cent Richard ore, and 51 per cent local ores.

The cupola charge consisted of 598 pounds of pig, 300 pounds of coke and 15 pounds of oyster shells.

THOMAS IRON CO. HOKENDAUQUA, PA.

Quality since 1854

The Thomas Iron Co.

Manufacturers of Foundry, Forge, Malleable and Basic Pig Iron

General Sales Office: EASTON, PA.

Philadelphia: 628 Stephen Girard Building
New York: 90 West Street Boston: Exchange Bldg., 53 State Street

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00 to 14.25
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.00
Malleable, Philadelphia	15.50 to 16.00
Malleable, Buffalo	13.00 to 14.00
No. 1X Philadelphia	15.00 to 15.25
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	13.75 to 14.25
No. 2 foundry, Ironton	13.00 to 13.50
No. 2 foundry, Chicago	14.00
No. 2X foundry, Philadelphia	14.75 to 15.00
No. 2X fdry., (N. J. tidewater)	14.25 to 14.75
No. 2X foundry, Buffalo	13.00 to 13.50
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, (N. J. tidewater)	14.00 to 14.25
No. 2 plain, Buffalo	12.75 to 13.25
No. 2 southern, Birmingham	10.00 to 10.50
No. 2 southern, Cincinnati	13.25 to 13.75
No. 2 southern, Chicago	14.60 to 14.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.35 to 14.85
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.00 to 14.25
Virginia 2X, Philadelphia	15.30 to 15.55
Virginia, 2X, Jersey City	15.30 to 15.75
Virginia, 2X, New Eng., all rail	15.75 to 16.25
Gray forge, (eastern Pa.)	13.75
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland	17.55
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	21.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.15 to 21.40
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex-ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi, non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7c
Foreign non-Bess., 50 to 65 per cent	7c

COKE

(At the ovens.)

Connellsville furnace	$1.70 to 1.75
Connellsville fur. contr.	1.75 to 1.85
Connellsville foundry	2.25 to 2.50
Connellsville fdy., contr.	2.35 to 2.50
Wise county furnace	1.85 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.80 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$100 to 110
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Billets, Pbgh. and Yn.	$21.00
Open-hearth bil., Phila.	22.40 to 23.40
Sheet bars, Pittsburgh and Yn.	22.00
Op-h'th sh. bars, Pbgh. and Yn.	21.00
Forging billets, Phila.	25.40 to 26.40
Forging billets, Pittsburgh	26.00
Wire rods, Pittsburgh	24.50 to 25.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c
Structural shapes, Chicago	1.38c
Structural shapes, Philadelphia	1.30c to 1.35c
Structural shapes, New York	1.31c to 1.36c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.38c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	46 cents

Tank plates, Pittsburgh	1.20c
Tank plates, Philadelphia	1.30c to 1.35c
Tank plates, New York	1.31c to 1.36c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.38c
Bars, soft steel Philadelphia	1.35c
Bars, soft steel, New York	1.36c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Hoops, less carloads, Pittsburgh	1.30c to 1.35c
Bands, Pittsburgh	1.20c
Shafting, carloads, Pbgh., disc. contract	65 to 66 off
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.07½c to 1.12½c
Bar iron, Philadelphia	1.15c to 1.20c
Bar iron, New York	1.20c to 1.30c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.95c to 2.00c
No. 28, black, Chicago	2.18c
No. 28, tin mill, black, Pbgh.	1.95c
No. 28, galvanized Pbgh.	2.95c to 3.00c
No. 28, galvanized, Chgo.	3.18c
No. 10, blue, annealed, Pbgh.	1.40c to 1.45c
No. 10, blue, annealed, Phila.	1.50c
Tin plate, 100 lb., coke, base	$3.60 to 3.75

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Wire nails, retailers, Pittsburgh	1.60 to 1.65
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Plain wire, retailers, Pittsburgh	1.40 to 1.45
Galvanized wire, jobbers, Pbgh.	1.75 to 1.80
Galvanized wire, retailers, Pbgh.	1.80 to 1.85
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	1.95 to 2.00
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, painted, retail'rs, Pbgh.	1.60 to 1.65
Barb wire, galv., retail's, Pbgh.	2.00 to 2.05
Barb wire, galv., jobbers, Pbgh.	1.95 to 2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads, 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅝ inch and larger, $7.20; ⅞-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.55c to 1.60c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.65c to 1.70c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point	80 and 20
Coach, gimlet point	80
Standard Jack	70 and 10
Mch., cut thread, flat head	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and 40 and 10
Mch. rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

CAR WHEELS

33-inch engine truck wheels	$22.50
36-inch engine truck wheels	23.50
33-inch tender wheels	18.50
36-inch passenger train car and tender wheels	20.50
33-inch freight car wheels	15.50

All with standard 2½ inch rims and minimum standard hubs, usual extras applying for thicker rims and larger hubs; all f. o. b. cars, Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.25c
⅝-inch	1.30c
½-inch	1.35c
⅜-inch	1.50c
¼-inch	1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)

	Discount.
American carpet tacks..	90 and 20 and 10 and 10
American cut tacks....	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel.....	47½ and 2½
Bright, iron and steel.....	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35, plain	1.17
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39, galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch, galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch, galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland.....	$22.35 to 22.80
Four-inch, water, Chicago.....	26.50
Six to 12 inches, Chicago.....	24.50
Larger sizes, Chicago.....	24.00
Six-inch, water, New York.....	20.50 to 21.50
Four-inch, water Birmingham...	19.50
Six-inch and larger, Birmingham.	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago.....	1.65c
Steel bars, Cleveland.....	1.80c
Steel bars, Cincinnati.....	1.70c to 1.85c
Steel bars, Philadelphia.....	1.75c
Steel bars, New York.....	1.80c
Steel bars, St. Louis.....	1.70c
Iron bars, Chicago.....	1.65c
Iron bars, Cleveland.....	1.75c
Iron bars, St. Louis.....	1.65c
Iron bars, Cincinnati.....	1.65c to 1.75c
Iron bars, Philadelphia.....	1.70c
Iron bars, New York.....	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago.....	1.75c
Shapes and plates, Cleveland....	1.90c
Shapes and plates, Cincinnati...	1.80c to 1.90c
Shapes and plates, St. Louis....	1.80c
Shapes and plates, Philadelphia.	1.75c
Shapes and plates, New York...	1.85c
No. 10 blue ann. sheets, Chgo..	1.95c
No. 10 blue ann. sheets, Cleve..	2.15c
No. 10 blue ann. sh., St. Louis.	1.90c to 2.00c
No. 10 blue ann. sheets, Cinci..	1.95c
No. 28 black sheets, Chgo.....	2.55c
No. 28 black sheets, Cleveland..	2.60c
No. 28 black sheets, Cincinnati.	2.45c to 2.55c
No. 28 black sh., St. Louis.....	2.45c to 2.55c
No. 28 galv. sheets, Chgo.....	3.55c
No. 28 galv. sheets, Cleveland..	3.60c
No. 28 galv. sheets, Cincinnati..	3.40c to 3.55c
No. 28 galv. sheets, St. Louis..	3.35c to 3.55c

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo...$	8.50 to 8.75
No. 1 railroad wrought, Cleve...	9.50 to 10.00

Freight Rates, Coke

Connellsville regions, per 2000 lbs., to:—

Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

No. 1 railroad wrought, St. L...	7.75 to 8.00
No. 1 railroad wrought, Cinci...	8.00 to 8.50
No. 2 railroad wrought Chgo....	8.00 to 8.25
No. 2 railroad wrought, St. L...	7.50 to 7.75
Arch bars and transoms, Chgo..	11.50 to 12.00
Arch bars and transoms, St. L..	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. and spr'gs, St. L.	9.25 to 9.50
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo.....	11.50 to 12.00
Steel car axles, St. Louis.....	11.75 to 12.25
Locomotive tires, Chicago.....	9.00 to 9.50
Locomotive tires, St. Louis.....	8.75 to 9.25
Cut forge, Chicago.....	8.00 to 8.25

Freight Rates Via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama Canal, per 100 lbs., in car load lots, exclusive of insurance and dockage.

From New York	$0.30
From Pittsburgh	.46
From Youngstown	.48
From Niles	.48
From Wheeling	.46
From Steubenville	.46
From Johnstown	.44½
From Coatesville	.39
From Steelton	.40
From Bethlehem	.37½

Pipes and flues, Chicago.....	6.50 to 6.75
Pipes and flues, Cleveland.....	7.75 to 8.25
Pipes and flues, St. Louis.....	5.75 to 6.25
No. 1 cast, Chicago.....	9.25 to 9.75
No. 1 cast, Cleveland.....	10.00 to 10.50
No. 1 cast, Cincinnati.....	8.50 to 9.00
No. 1 cast, St. Louis.....	9.50 to 10.00
No. 1 busheling, Chicago.....	7.25 to 7.50
No. 1 busheling, Cleveland.....	8.25 to 8.50
No. 1 busheling, Cincinnati.....	5.75 to 6.25
No. 1 busheling, St. Louis.....	7.25 to 7.50
No. 2 busheling, Chicago.....	5.75 to 6.00
No. 1 boiler plate, cut, Chgo....	6.25 to 6.75
No. 1 boiler plate, cut, Buffalo.	9.00 to 9.50
No. 1 boiler plate, cut, St. L....	6.00 to 6.50
Boiler punchings, Chicago.....	8.50 to 9.00
Cast borings, Chicago.....	4.50 to 5.00
Cast borings, Cleveland.....	6.00 to 6.25
Cast borings, Cincinnati.....	4.25 to 4.75
Cast borings, St. Louis.....	4.00 to 4.50
Machine shop turnings, Chgo...	5.00 to 5.25
Machine shop turnings, Cleve...	5.00 to 5.25
Machine shop turnings, Cinci....	4.25 to 4.75
Machine shop turnings, St. L....	4.50 to 5.00
Malleable agl., Chicago.....	7.75 to 8.25
Malleable agricultural St. Louis.	7.50 to 8.00
Malleable, railroad, Chicago....	8.25 to 8.50
Malleable, railroad, Cincinnati...	6.50 to 7.00
Malleable, railroad, St. Louis...	7.50 to 8.00
Angle bars, iron, Chgo.....	11.50 to 12.00
Angle bars, iron, St. Louis.....	10.00 to 10.50
Angle bars, steel, Chgo.....	8.25 to 8.75
Angle bars, steel, St. Louis.....	9.25 to 9.50
Stove plate, Chicago.....	8.50 to 8.75
Stove plate, Cleveland.....	7.75 to 8.00
Stove plate, Buffalo.....	9.75 to 10.00
Stove plate, Cincinnati.....	6.50 to 7.00
Stove plate, St. Louis.....	8.25 to 8.75
Bundled sheet, Cincinnati.....	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh.....$	11.50 to 11.75
Heavy melting steel, Buffalo....	10.00 to 10.50
Heavy melting steel, Chicago...	9.50 to 9.75
Heavy melting steel, Cleveland..	10.00 to 10.50
Heavy melting steel, Cincinnati.	9.00 to 9.50
H'vy melting steel, eastern Pa...	10.50 to 11.00
Heavy melting steel, New York.	8.75 to 9.00
Heavy melting steel, St. Louis..	11.00 to 11.50
Bundled sheet Buffalo.....	6.25 to 6.50
Grate bars, Buffalo.....	9.50 to 10.00
Grate bars, New York.....	7.00 to 7.50
No. 1 railroad wr'ght, east Pa..	12.00 to 12.50
No. 1 railroad wrought, Pbgh...	11.50 to 11.75
No. 1 R. R. wght. New York...	10.25 to 10.50
No. 1 R. R. wrought, Buffalo..	11.00 to 11.50
Shafting, New York.....	12.00 to 12.50
Pipes and flues, New York.....	8.00 to 8.50
Pipes and flues, eastern Pa.....	10.50 to 11.00
Mch. shop turnings, New York..	6.25 to 6.50
Machine shop turnings, Buffalo..	5.50 to 6.00
Mch. shop turnings, Pbgh.....	7.75 to 8.00
Mch. shop turnings, eastern Pa.	8.00 to 8.50
Cast borings, New York.....	6.50 to 7.00
Cast borings, eastern Pa.....	8.50 to 9.00
Cast borings, Buffalo.....	6.00 to 6.50
Cast borings, Pittsburgh.....	8.50
Stove plate, (Jersey points).....	8.25 to 8.50
Stove plate, Pittsburgh.....	8.75 to 9.00
Stove plate, eastern Pa.....	8.50 to 9.00
Shoveling steel, Chicago.....	8.75 to 9.00
Shoveling steel St. Louis.....	8.00 to 8.25
Reroll'g rails, 5 ft. & ov., Pbgh.	13.00
Reroll. rails, 5 ft. & ov., Chgo..	11.25 to 11.50
Reroll. rails, 5 ft. & ov., Cleve..	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
Reroll. rails, 5 ft. & ov. St. L..	11.25 to 11.50
Steel rails, short, Chicago.....	10.00 to 10.25
Steel rails, short, Cleveland.....	12.50 to 13.00
Steel rails, short, St. Louis.....	10.50 to 10.75
Iron rails, Cleveland nom.....	13.25 to 13.75
Iron rails, Cincinnati.....	10.25 to 10.75
Iron rails, eastern Pa.....	14.00 to 15.00
Iron rails, St. Louis.....	11.00 to 11.25
Iron rails, Pittsburgh.....	13.00 to 13.50
Frogs, switches, guards, Chgo..	9.50 to 9.75
Frogs, switches & g'rds. St. L..	10.50 to 10.75
Car wheels, (iron), Pittsburgh..	11.25 to 11.50
Car wheels, (steel), Pittsburgh..	12.75 to 13.00
Car wheels, Chicago.....	10.75 to 11.00
Car wheels, eastern Pa.....	11.00 to 11.50
Car wheels, Buffalo.....	12.00 to 12.50
Car wheels (N. J. points).....	10.50 to 11.00
Car wheels, St. Louis.....	11.00 to 11.25
Iron axles, Pittsburgh.....	19.00 to 20.00
Iron axles, Cincinnati.....	19.00 to 20.00
Iron axles, eastern Pa.....	20.00 to 21.00
Iron axles, Buffalo.....	21.50 to 22.00
Iron axles, Chicago.....	18.25 to 18.50
Steel car axles, New York.....	12.50 to 13.00
Steel car axles, Buffalo.....	15.00 to 15.50
Steel car axles, Cleveland.....	14.00 to 16.00
Steel car axles, eastern Pa.....	14.50 to 15.00
No. 1 busheling, Buffalo.....	8.50 to 9.00
No. 1 busheling, Pittsburgh....	9.00 to 9.50
No. 2 busheling, Buffalo.....	6.00 to 6.50
Low phosphorus steel, Buffalo..	15.00 to 15.50
Low phosphorus steel, Pbgh.....	14.00 to 14.50
Low phos. steel, eastern Pa.....	14.50 to 15.00
No. 1 forge, eastern Pa.....	8.00 to 8.50
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh.....	11.00 to 11.50
No. 1 heavy cast (N. J. points)	11.00 to 11.50
Boiler plate, Cleveland.....	8.50 to 9.00
Mall. iron, agricul., Cleveland...	9.00 to 9.50
Mall. iron R. R. Cleveland.....	10.25 to 10.75
Malleable, railroad, Pittsburgh..	9.50 to 10.00
Mall. R. R., Buffalo.....	10.75 to 11.25
Mall., R. R. east. Pa.....	9.00 to 9.50
Bundled sheet, Pittsburgh.....	8.50 to 8.75
Bundled sheet, Cleveland.....	7.50 to 8.00

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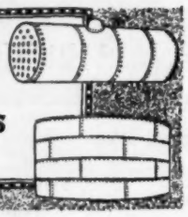

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SERVICE and QUALITY UNEXCELLED
MUSKEGON - MICHIGAN

Pure Air for Underground Mines

(*Continued from page* 430.)

collars, and the presence or absence of steam pipes in the shaft; (c) by the use of fans either at the shaft collar or within the mine. A blower fan at the collar of the down-cast shaft is preferable. If an air shaft is not available, that is, one that is not used for hoisting, it may be possible to utilize the manway in an operating shaft as an airway, but in this case the partition between the manway and the hoisting compartments must be absolutely tight. If it is not practicable to place the fan at the shaft collar, it must then be placed within the mine workings, preferably a blower fan somewhere near the down-cast shaft.

Many of the mines have a sufficient amount of air passing into them but, owing to insufficient airways, most of the air escapes from the mine without reaching the working places. Such conditions can be remedied by the runnings of additional crosscuts, drifts and raises for carrying the air, and by the installation, at proper places, of doors and brattices. An important aid in ventilating dead ends, may be found in the intelligent use of electrically operated booster fans.

With regard to measures looking to a reduction in the noxious gas produced in the mine, those worthy of consideration are: (a) The treatment of timber with such preservatives as will prevent or retard oxidation or rotting, and (b) the use of explosives that produce a minimum amount of noxious gases.

On account of the many reports received of the serious effect of power gases on miners, the Bureau of Mines recently undertook an investigation with the hope of developing a powder which would evolve, on detonation, a minimum quantity of noxious gases.

As the result of a number of tests with straight nitroglycerine, low freezing, ammonia, and gelatine dynamites, the fact was brought out that the gelatine dynamites evolve smaller quantities of noxious gases than any other. Several samples of 40 per cent gelatine dynamites were procured from different manufacturers; of these samples the whole produced poisonous gases on detonation. The percentage of carbon monoxide varied from 3 to 5.7 per cent and of hydrogen sulphide from 0.7 to 4.1 per cent. As a final result of the investigations a 40 per cent strength gelatine dynamite was prepared according to the following formula:

	Per cent.
Nitroglycerin	33
Nitrocellulose	1
Sodium nitrate	54
Combustible material (flour)	11
Calcium carbonate	1
	100

The results of tests made for gaseous products with this explosive are as follows:

	Per cent.
Carbon dioxide	51.0
Carbon monoxide	0.0
Oxygen	0.9
Hydrogen	0.0
Methane	0.7
Nitrogen	47.4
Hydrogen sulphide	0.0
	100.0

In order to determine whether these results could be checked in actual mine operation, tests were made in two different mines and the results were practically the same.

A series of handsome four-page bulletins recently has been issued by The Browning Co., Cleveland, describing the six-cylinder railway ditchers, locomotive cranes, pile drivers and grab buckets built by this concern. Each bulletin is printed in two colors, with a large number of illustrations showing the various machines in actual service.

Pointers for Blast Furnacemen

(*Continued from page* 434.)

seldom over 1,200 degrees, even for short periods of time. The details have been governed largely by considerations of structural strength and facility of cleaning. Most of the two pass stoves are built with 9-inch checker openings and 3-inch walls. The three pass stoves generally have 4-inch walls and an average size of checkers not less than those of the two pass stoves.

Aside from the question of cleaning, and with the object of gaining as large heating surface as possible inside a given shell, the thickness of the checker walls should be as small as strength will permit, and the openings the same diameter as the checkers. With 3-inch walls, a reduction in the diameter of the openings from 9 inches to 6 inches will increase the surface about 18 per cent and a reduction to 4 inches about 30 per cent. With a 2½-inch wall and 4-inch openings the increase in surface is over 51 per cent. By changing these sizes it is therefore possible, where washed gas is available, to make a very considerable increase in the capacity of the stove without increasing the radiating surface of the shell, and this fact forms one of the strongest arguments for the use of washed gas for stoves. With unwashed gas, the percentage of increase of surface which it is practicable to make is relatively small, since 6 inches in diameter of opening is generally considered the smallest advisable.

Aside from increase in surface there are other advantages of small checkers, due to the changed ratios of surface to volume, which result in much greater intimacy of contact between the air or gas and the brick work, and a much better economy in a stove of any given height.

How to Increase Stove Capacity

The method of increasing the stove capacity will vary at each plant in accordance with the size of existing stoves, the final determination of minimum dimensions in the checkers and the number of square feet required. A lower limit of 3 inches in the thickness of the checker walls and 4 inches in diameter of opening will barely enable the small 21 x 100-foot two pass stoves to reach the present capacity of the larger three pass stoves, four of which run a little below 200,000 square feet, and any increase above this figure will require additional height or a fifth stove. The capacity of the 22 x 100-foot three pass stoves can be increased over 30 per cent by the use of 3-inch walls and smaller openings.

A recent description of a German method of forcing the air for combustion of gas into the stoves, and the consequent ability to run the furnace with two stoves, one on air and one on gas, has attracted some attention in this country. Comparison shows, however, that the four stoves in question which were operating on a furnace making 168 tons of iron per day were as large as the stoves of some American furnaces making 500 tons per day, and that with only half this equipment in use, the square feet of heating surface per ton per day, and probably per volume of air blown remains greater than is the case at most American furnaces. The so-called "forcing" is, therefore, not forcing according to our standards.

An exceedingly handsome booklet, containing photographs in colors of the Panama canal, has been issued by the Ingersoll-Rand Co., New York City. The descriptive matter is a reprint of an article published in *Scribner's Magazine*, July, 1913, written by Emory R. Johnson, special commissioner on traffic and tolls. The views show this stupendous work in great detail and their reproduction in color greatly adds to their attractiveness.

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Miscellaneous Classified
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